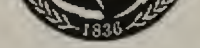

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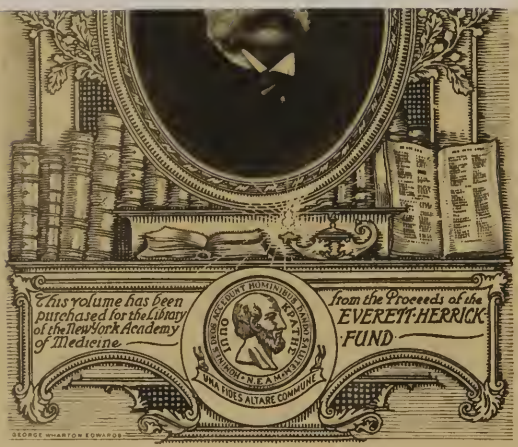

SURGICAL AND WAR NURSING

SURGICAL AND WAR NURSING

BY

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WITH 79 ILLUSTRATIONS

ST. LOUIS
C. V. MOSBY COMPANY
1918

Press of
C. V. Mosby Company
1918

PREFACE

The author has not attempted, in this small volume, to cover the whole subject of nursing, but only such phases of the subject as would be of practical value in the average surgical case.

The primary intention is that this book will take an intermediate position between a reference and a text book, and that it will find favor with the student of nursing as well as with the graduate. The fact that nurses are not doctors has not been lost sight of in its preparation, hence much of the matter may seem elementary.

The author has drawn largely from his lectures delivered to the nurses at the Good Samaritan Hospital Training School for much of the material used. In the preparation of the chapters on War Nursing, he has been guided by his personal experience as a United States Army Surgeon during the Spanish-American War, and by intimate acquaintance with eminent surgeons recently returned from the European battle fields.

The subject of nursing is so closely allied to that of medicine that at times it is hard to separate them, therefore much will be presented which the nurse should know, but less which she will be called upon to practice.

The illustrations of the instruments of appliances have been supplied by The Max Wocher & Son Co., Cincinnati, Ohio.

A. H. B.

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CHAPTER I

NURSING AS A PROFESSION

Nursing was formerly done by the inexperienced, and, in many instances, by those of questionable character. Their lack of ability to care for the sick was only exceeded by their ignorance of what constituted a respectable knowledge of their profession. This condition existed prior to and for a long time after the advent into the world of Christianity, and was practiced mostly in prisons and alms houses; however, as time went on, this condition gradually grew better until only a few years since the trained nurse came upon the stage of action, equipped with a more accurate knowledge of how to nurse those entrusted to her care.

Nursing is, indeed, an exalted calling; and, like other professions, is not attained without much labor, thought, and self-sacrifice. The saying, "There is no excellence without great labor," is certainly true as regards nursing. I know of no work whose duties are more exacting and at the same time requiring a greater patience than that of nursing.

Nursing has taken its place alongside other professions, and as years go by we see its scope widening and the nurse becoming more efficient until now she has become well nigh indispensable.

The public has gradually become acquainted with the

possibilities of the professional nurse, and has come to respect the noble profession which she represents. Today we have the large hospitals and their training schools where thousands of young women are fitted for their life's work to go forth into the world, many of whom reflect great credit on their Alma Mater.

Other professions have their national and state associations, and so have the nurses. They are alive to the great benefit to be derived from reading papers and exchanging views. They have their State Board of Examiners, and in many states have succeeded in getting laws passed which undoubtedly redound to the good of the profession.

The word *profession* is used instead of *occupation* or *vocation* for the reason that nursing is truly a profession. The many duties which a nurse is called upon to perform are so closely allied to the many scientific and intricate problems of the human body that nursing is no longer largely a matter of guess work, but one in which skill, judgment, and the greatest care must be exercised.

Those practicing nursing occupied a peculiar position in the early days of professional nursing, as it was hard for a family in which she nursed to be sure of the professional's social status; but time has remedied this, and the professional is now considered the equal of those whom she serves. Many women from the best and most influential families have made professional nursing their life work.

It may be said before closing this short chapter on nursing as a profession, that the practice of surgery as carried on at the present time would be an extremely laborious task were the preoperative arrangements left to the surgeon. Nursing therefore is not only a boon

to the sick but a very valuable adjunct to the surgeon.

Nursing has attracted many women. Some are prompted to take it up from a monetary consideration, others from a pure love of service to others. The latter class always excel, as nursing is like medicine and surgery. They go hand in hand, spurred on by one great impetus; that is, to save. This is beautifully expressed by Holmes in a poem which was read at a meeting of the Massachusetts Medical Society in 1855, the sentiment applying equally well to the nursing profession:

As Life's unending column pours,
  Two marshalled hosts are seen,
Two armies on the trampled shores
  That death flows black between.

One marches to the drum beat's roll,
  The wide-mouthed clarion's bray,
And bears upon a crimson scroll,
  "Our glory is to slay."

One moves in silence by the stream,
  With sad, yet watchful eyes,
Calm as the patient planet's gleam
  That walks the clouded skies.

Along its front no sabers shine,
  No blood-red pennons wave,
Its banner bears the single line,
  "Our duty is to save."

CHAPTER II

THE SURGICAL NURSE

The surgical nurse should be a woman whose very presence would inspire confidence. Her health should be excellent, as nothing so handicaps a nurse as to be always complaining or not well. No woman should undertake nursing whose personal and family history is loaded with disease. She should give scrupulous attention to her teeth. Nothing so detracts as bad teeth, and sometimes a very small cavity will cause a foul breath which is very offensive and abominable to patients whose stomachs are none too strong. The nose and throat should receive careful attention, as well as the stomach and bowels, and the latter should always be regular, as no single factor, probably, causes more discomfort than constipation.

These conditions should be watched, and if need be, the nurse should see, regularly, a dentist or a specialist. She should give great care to her feet. She is likely to be required to be on her feet continuously for a long period of time. Properly fitting shoes with nightly bathing will usually insure her against trouble.

The hair should be thoroughly cleansed before entering upon a case, to guard against carrying a disease from one patient to another. The nails should be given constant attention to prevent scratching the patient while handling. Cutting the nails closely and regularly, together with plenty of soap, warm water and a brush, with thorough drying will usually suffice to keep them in good condition.

The clothes worn by a nurse should be of such material as will stand frequent boiling and washing, as frequent changes are required while nursing a case. Under no circumstances should she wear the same uniform in two consecutive cases without subjecting it to a thorough washing. The uniforms should be of pleasant color, not loud, preferably white, and the laundress should be instructed not to place too much starch in them, as the noise from a stiff uniform worn by a nurse while moving about in a sick room may cause undue discomfort to the patient.

In nursing a case in which there is pus, there is always a possibility of contamination, in which event the clothing should be immersed for three or four hours in a solution of zinc sulphate four ounces, sodium chloride two ounces, to one gallon of water; or, they may be left for one or two hours in a solution of 1:20 carbolic acid, or 1:10,000 bichloride, after which they are wrung as dry as possible and sent to the laundry.

The manner and temperament of a nurse at all times should be pleasing and gentle, voice never loud, movements easy; she should be willing to accommodate the patient so far as is consistent with his or her welfare. Nurses who are moody are usually short lived in the profession, as their shortcomings become known early and are calculated to make few friends either in or out of the profession. Patience, sympathy, and kindness are all necessary, but should at all times be subservient and under the control of a well-balanced mind. The surgical nurse should be a person of keen perceptions, and thoroughly alert at all times to the condition of the patient.

The five senses with which she has been endowed should in no wise be impaired, as the slightest deviation

in one of these from the normal would place her beyond the pale of usefulness.

The time off duty should be spent if possible in the open where fresh air and exercise may be taken. Exercise, while very necessary, should never be taken to excess. Every nurse should be off duty a portion of each day, and it is well to so arrange her time that she may be on duty during the visit of the surgeon in charge. From two to five o'clock in the afternoon seem to be the popular hours, but she should consult the convenience and wishes of the surgeon, and possibly also of the family when the case is in a private home.

The nurse should bear in mind that she owes the patient the best service which she is capable of rendering, and her undivided attention; and nothing should distract her or cause her in any way to give, either by word or deed, the slightest semblance of neglect on her part toward the patient.

She should be absolutely loyal to the surgeon in charge, recording conscientiously and carefully all that may transpire between his visits, so that the chart will not be a jumbled lot of notes without much significance, but an intelligent and methodical record. All explanations to the surgeon should be made outside the sick room if possible, and not before the patient, who is usually on the alert to know of his condition.

The habit some nurses have of talking to the patient, family or friends about one surgeon or another, is a pernicious practice and should be studiously avoided.

When two nurses are employed on a given case, their duties to each other are plain. The nurse first employed should be in charge, and the second nurse should act in the capacity of assistant. Their relations at no time

should be strained, as this will at once defeat their efforts and the patient may suffer as the result. The code of ethics that nurses now work under is no doubt familiar to all, and if carefully observed it will prevent many misunderstandings between nurses, that might otherwise arise.

The public is at all times critical and ever ready to

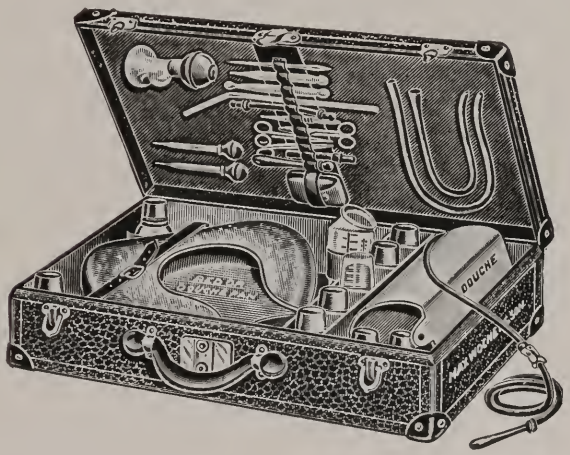


Fig. 1.—A nurse's complete outfit for visiting nurses.

say things that are not pleasant to hear. The nurse is not exempt from these criticisms, and being cognizant of this fact, she should at all times and under all circumstances so conduct herself as to dispel all doubt as to her sincerity of purpose and to command the highest respect.

CHAPTER III

BANDAGES AND INSTRUMENTS

Bandages

Bandages are made of a variety of material, such as cotton, flannel, crinoline, rubber, etc. Bandages are used to exert pressure, to hold dressings or splints in apposition to the surface of the body or limbs, as the case may be, and to give support to certain parts of the body; as, for instance, in the use of abdominal supports.

While much may be gained by reading textbooks on bandaging, to become expert one should have considerable practice, and should study the condition for which a bandage is applied, the particular kind of bandage to use, and also the parts to be bandaged should be taken into consideration. The mere fact of making a bandage fit like a kid glove is not all there is to bandaging. Broadly speaking, a bandage should be placed on smoothly and the pressure exerted should be equally distributed.

Cotton, flannel, linen, or gauze bandages are most commonly used in the form of a roller of various widths, depending on the part of the body to be bandaged. The length of the average roller is either twelve or fifteen feet.

Plaster of Paris, crinoline, and silicate of sodium are usually employed to fix a limb or the spine, as in the use of the plaster jacket, and extensively used as splints in broken bones to insure their immobility.

Fig. 2.—Thumb bandage. Ascending spiral bandage.

Fig. 3.—Ascending reverse bandage.

Fig. 4.—Bandage to protect eye.

Fig. 5.—Velpeau bandage.

Fig. 6.—Skull cap bandage. Spica bandage for shoulder which may be extended down arm.

Fig. 7.—Box and knife for cutting gauze rolls into bandages of desired length.

Bandage roller

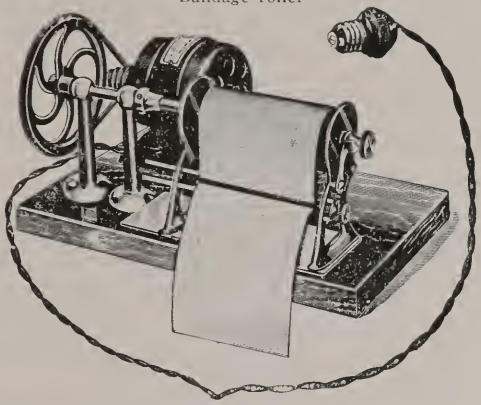


Fig. 8.—Electric bandage roller.

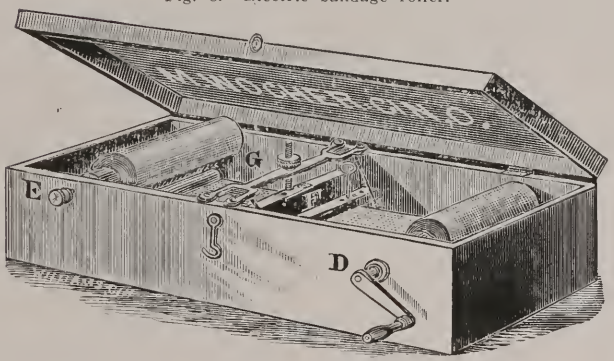


Fig. 9.—Plaster of Paris bandage machine. Spreads plaster on bandage which is then rolled by turning crank.

Where a dressing is to be placed on a particular part of the body, and where for good and sufficient reasons none of the above named articles used for bandaging is deemed expedient, adhesive plaster in various widths and lengths is sometimes used.

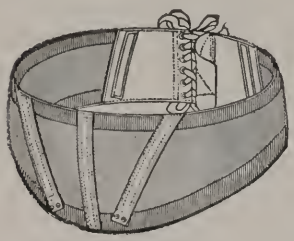


Fig. 10-*A*.*—Lightweight abdominal supporter with stays for corpulency or hernia.

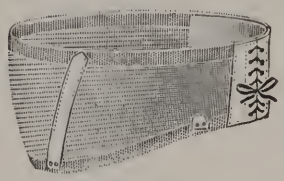


Fig. 10-*B*.—Elastic abdominal supporter with stays for corpulency.

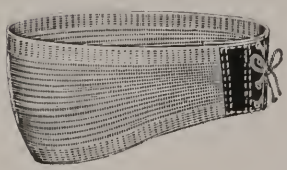


Fig. 10-*C*.—Elastic abdominal supporter without stays for pregnancy.

Fig. 10-*D*.—Abdominal belt with uterine supporter for prolapse of uterus.

Flannel bandages are used when it is desired to reduce swelling, and its frequent site of application is the extremities.

The abdominal bandage is used extensively by some

*The illustrations of instruments and appliances throughout the book have been supplied through the courtesy of the makers, The Max Wocher & Son Co., Cincinnati, Ohio, from whom they can be secured.

surgeons after abdominal operations, and while in many cases (and especially in those cases of pendulous abdomens) they are of undoubted service, at the same time they can be worn too tight and too long, so that

Fig. 11.—Minor operating scalpel.

the normal muscular tone in many cases is to a certain extent impaired.

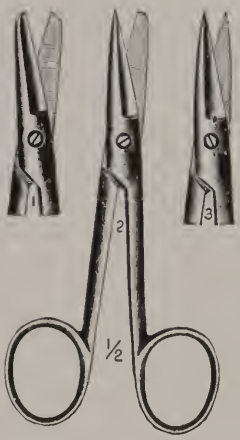
These bandages are made of drilling with eyelets to lace either in the front or back, or the many-tail cotton bandage is frequently used to support the abdomen. They are also often made of silk or of silk and

Fig. 12.—Series of minor operating scalpels, bistouries, abscess and hernia knives.

rubber. All abdominal bandages should fit snugly and exert even backward and slightly upward pressure, and by all means should be provided with straps to prevent the bandage from riding upwards.

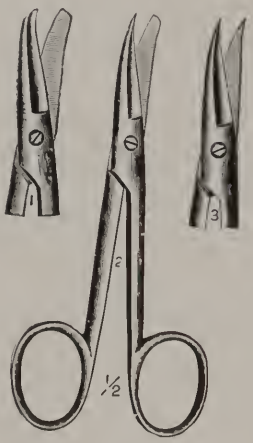
Instruments

The instruments used in operative work will depend upon the surgeon and what he is accustomed to use in



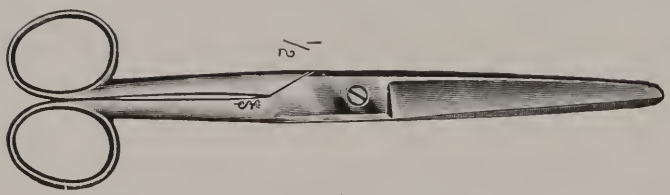
A

Fig. 13-A.—Straight surgical scissors.



B

Fig. 13-*B*.—Surgical scissors curved on the flat.



A

B

Fig. 14.—Gauze and bandage scissors.

this or that particular operation. Some surgeons use many more instruments in performing an amputation of the leg than others; and while it is necessary to have a sufficient number of the right kind of instruments, it must not be construed that the large array used by some operators is by any means indicative of their skill.

The cutting instruments are the knives and scissors.

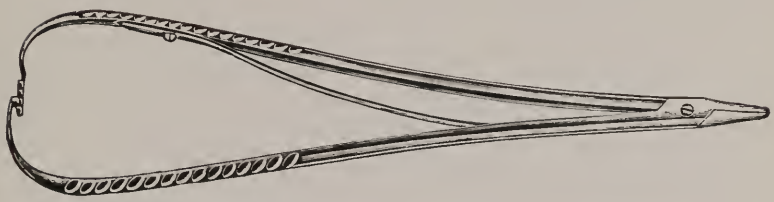


Fig. 15.—Mathew needle holder for regular surgical needles.

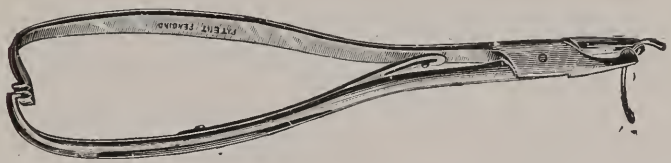


Fig. 16.—Universal needle holder for regular as well as Hagedorn needles.

Fig. 17.—Tissue forceps.

The knives are the scalpel, tenotome, long amputating knife, and the bistoury either sharp and curved or straight and blunt pointed. The scissors commonly used are straight and either sharp or blunt pointed, curved, and those used in perineal work, which are so made as to work on either right or left side.

The needle holders are of various designs; however the simpler their construction the more serviceable, as

a rule. They are used to hold Hagedorns, round, full curved and flat needles.

Tissue forceps, sometimes called by surgeons "thumb forceps," are made with and without teeth.

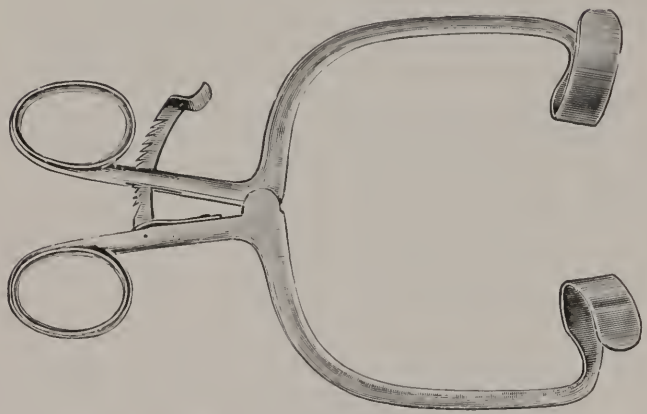


Fig. 18.—Self-retaining abdominal retractor.

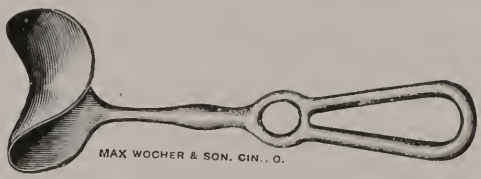


Fig. 19. —Abdominal retractor.

Fig. 20.—Abdominal retractor.

Retractors are used to hold the edges of the wound apart, and thereby to give better access to the parts involved. The large retractors are used in abdominal

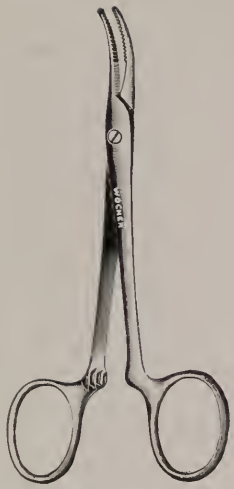


Fig. 21.—Kelly's curved artery forceps.

Fig. 22.—Kelly's straight artery forceps.

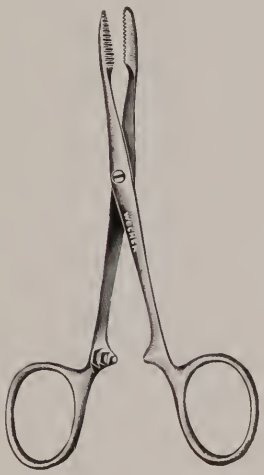


Fig. 23.—Pean's artery forceps.

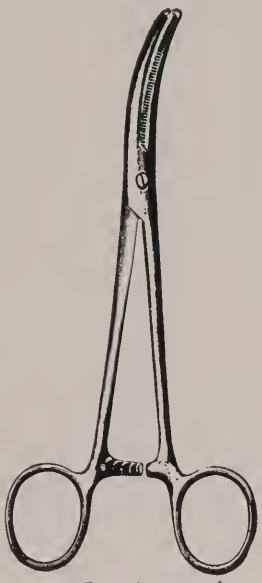


Fig. 24.—Curved artery forceps mouse tooth.

Fig. 25.—Pedicle clamp.

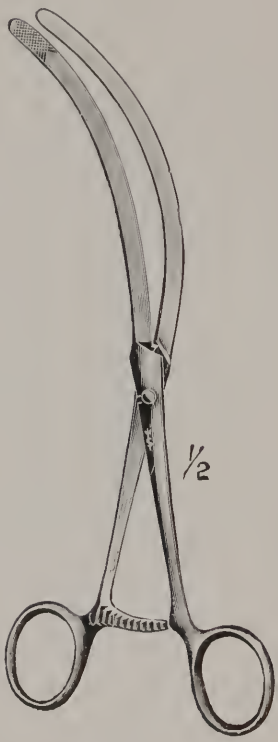


Fig. 26.—Intestinal clamp.

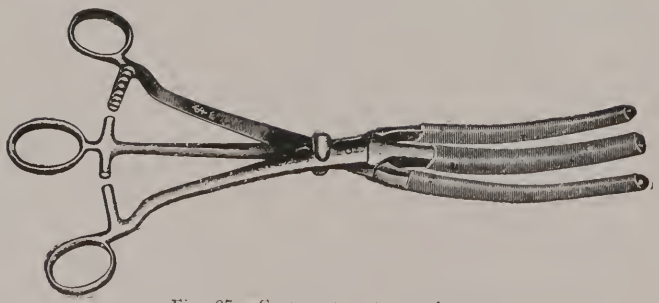


Fig. 27.—Gastroenterostomy clamp.

Fig. 28.—Dressing forceps.

Fig. 29.—Vulsellum forceps.

Fig. 30.—Uterine sound.

Fig. 31.—Intrauterine douche.

work, and the small retractors are used in smaller wounds and in holding open the eyelids during an operation upon the eyeball.

Forceps are of a variety of patterns: Hemostatic for-

ceps are used in controlling bleeding. The long flat or curved clamps are used not only to prevent hemor-

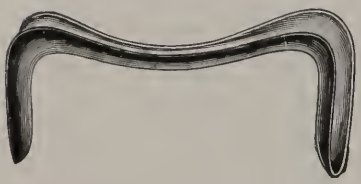


Fig. 32.—Sims' speculum.

Fig. 33.—Bivalve speculum.

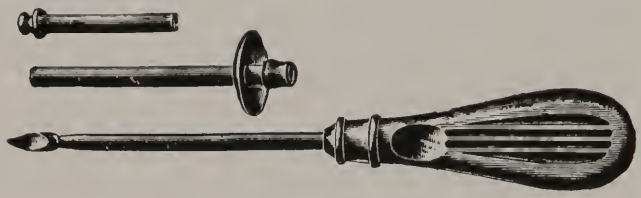


Fig. 34.—Trocar and cannula.

Fig. 35.—Silver probe.

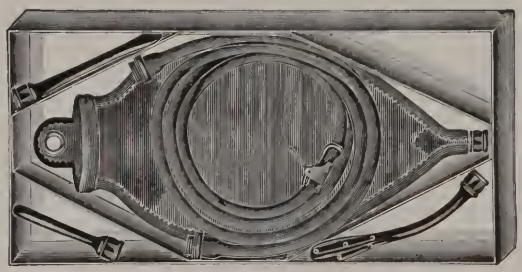


Fig. 36.—Fountain syringe.

rhage, but to grasp a mass of tissue such as the broad ligament, etc. The special clamp or forceps such as

Fig. 37.—Glass hypodermic syringe.

Fig. 38.—Gum male catheters.

Fig. 39.—Perfection porcelain enameled bed pan.

Fig. 40-*A*.—Female white enamel urinal.

Fig. 40-*B*.—Male white enamel urinal.

are used in gastroenterostomy and intestinal work, have long slender blades that are usually covered with rubber tubing to prevent injuring the bowel.

Sponge forceps are long forceps with long handles

and are used in mopping out the pelvic and other cavities.

Speculums are used in making vaginal examinations

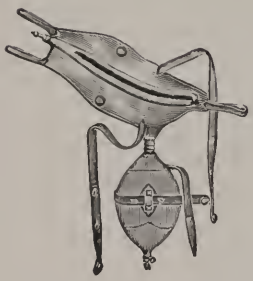


Fig. 41-*A*.—Female rubber urinal to be worn by patient suffering from incontinence of urine.

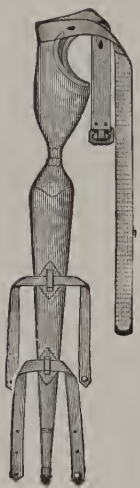


Fig. 41-*B*.—Male rubber urinal to be worn by patient suffering from incontinence of urine.

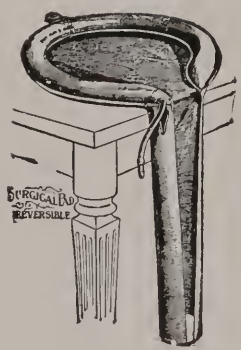


Fig. 42.—Kelly pad for douching or operating.

whereby a better view may be had of the cervix and vaginal vault, and in operative work on the cervix and vagina. The types generally employed are the bivalve

and the Sims; the cylindrical speculum made usually of hard rubber or glass is used in making applications to the vaginal wall and cervix. The specialist uses a small ear speculum for examination and treatment of the ear.

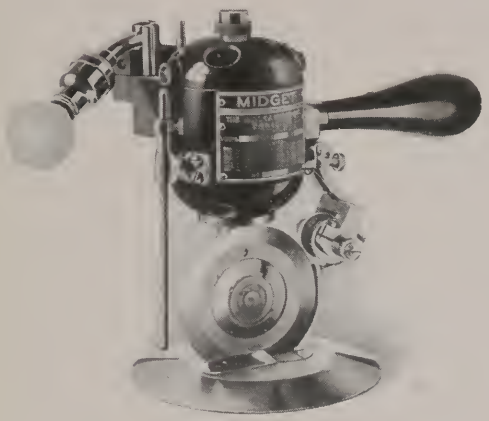


Fig. 43.—Electric gauze cutter for pads, etc.

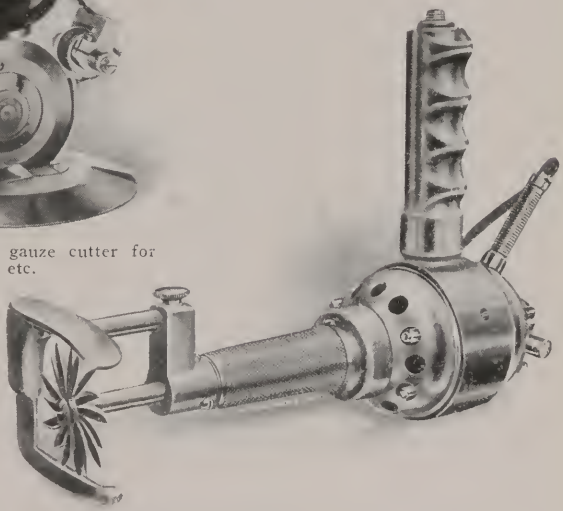


Fig. 44.—Electric plaster of Paris bandage cutter.

Dressing forceps are long, curved forceps, used mostly in vaginal and uterine work.

Uterine sound is a long, slender, graduated instrument employed in measuring the length of the uterus. The intrauterine douche is an instrument used to irrigate the uterine cavity.

Volsellum forceps are curved or straight forceps which have teeth, and are used to grasp and hold tissue.

Trocar and cannula are used in drawing water from the abdomen, tapping large cysts and distended gall

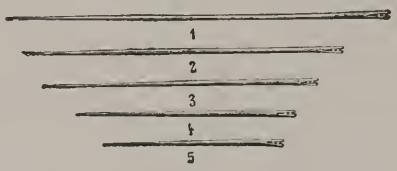


Fig. 45.—Straight surgical needles.

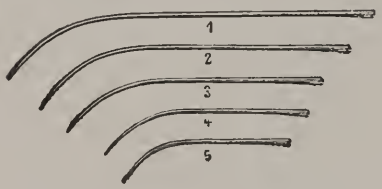


Fig. 46.—Half curved surgical needles.

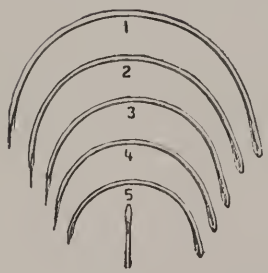


Fig. 47.—Full curved surgical needles with large eye for catgut.

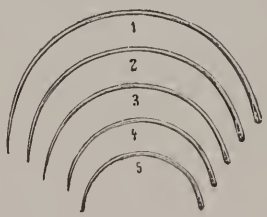


Fig. 48.—Full curved surgical needles.

bladder. It consists of a metal tube (cannula) through which is passed a sharp-pointed instrument (trocar) and, thrust into a cavity to be drained, the trocar is removed, leaving the cannula *in situ*.

Grooved directors and small silver probes are instruments which are frequently required in following up

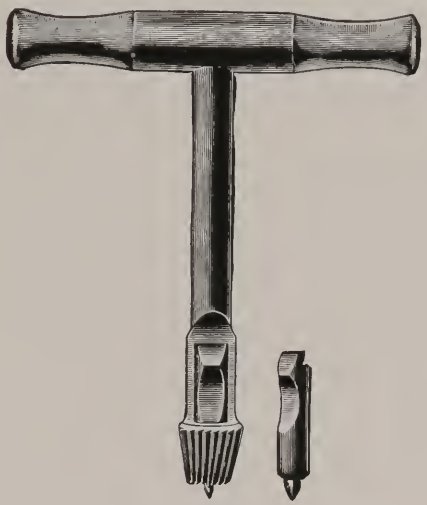


Fig. 49.—Trephine for skull operations.

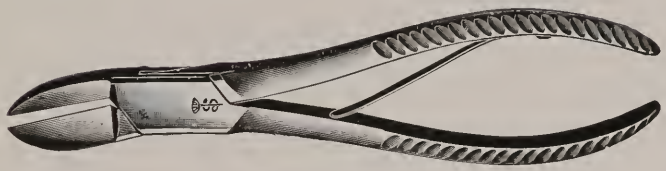


Fig. 50.—Bone forceps.

Fig. 51.—Periosteal elevator.

and cutting fistulous tracts and for diagnostic purposes.

Syringes are of several kinds. The fountain and the Davidson syringes are used in irrigating and douching.

Fig. 52.—Uterine dilator.

Fig. 53.—Uterine curette.

Fig. 54.—Spoon curette.

The small rubber bulb syringe is used in washing small cavities such as the ear and small abscesses.

The hypodermic syringe is used to administer medi-

cine subcutaneously, and is also used to inject into and around the field of operation such drugs as act as a local anesthetic, such as novocaine, quinine, and urea hydrochloride, and cocaine.

Catheters are both male and female, and are made of soft rubber, glass, and metal. Some catheters are so constructed that the bladder may be washed out after the urine has been withdrawn.

Bed pans, urinals, and Kelly's pad are all accessories which should be on hand.

Male urethral sounds are made of steel and are used to dilate the urethra. They are graduated in size in the English, French, and American scale.

Needles and Suture Material. The needles used are straight, full and half curved, round, flat, and cutting. Sutures and ligatures are made of catgut, silk, linen, and silkworm gut of various sizes. The catgut is of two varieties, plain and chromic, the latter being so treated in the course of its preparation as to prevent its absorption until ten, twenty, or thirty days, and ranges in size from 0 to No. 3.

Tourniquet. This is a piece of flat rubber about thirty inches long, used to prevent hemorrhage by winding it tightly around the limb. It is employed chiefly in operative work on the extremities.

Ligature carriers, used to carry a ligature through a mass of tissue, are of several varieties, the Cleveland ligature carrier being most frequently employed.

CHAPTER IV

STERILIZATION

It would be impossible to review in one short chapter the entire subject of sterilization; therefore, only such phases of this important subject will be discussed as the well-trained nurse should know, and which she will be called upon daily to put into practice.

As bacteriology is closely linked to sterilization, the nurse is respectfully referred to the standard textbooks on that subject, of which there is a plentiful supply.

Sterilization may be accomplished in two ways: first, by heat, either moist or dry; and second, by the use of chemicals.

If heat is to be used, the article to be sterilized should be placed in an oven or dry sterilizer in which the temperature is raised to not less than 110° to 230° C., and maintained for one to three hours. Should moist heat be used, it may be applied in the form of steam raised to a temperature of 250° C., or better to 270° C. for twenty minutes; or by placing the articles in boiling water for a considerable length of time. In case boiling is used, it frequently happens that certain chemicals are added to render the process more complete.

The sterilization of all small instruments is best accomplished by thoroughly washing with brush, soap and hot water, and then boiling for one-half hour in a one per cent solution of sodium carbonate, which prevents the rusting that is noticed after boiling in plain water to which the soda has not been added.

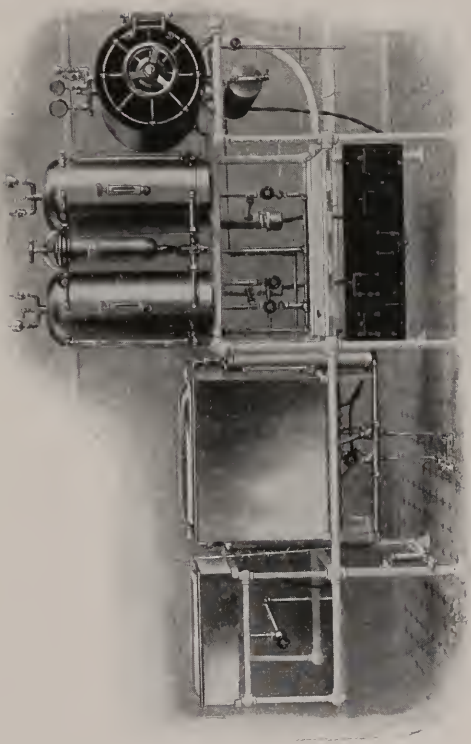


FIG. 55.—Complete sterilizer equipment comprising 1 dressing sterilizer, 1 pair water sterilizers, 1 utensil sterilizer, and 1 instrument sterilizer, supplied for gas, steam, or electric heating.

It has been said that all instruments with a cutting edge are dulled by boiling, and many surgeons prefer to have them scrubbed with brush, soap and hot water, and then placed for some time in 1:20 carbolic acid solution. While this is very effective, it does not compare to boiling, especially when one considers that some germs withstand the action of chemicals for a much longer period than when subjected to the boiling process.

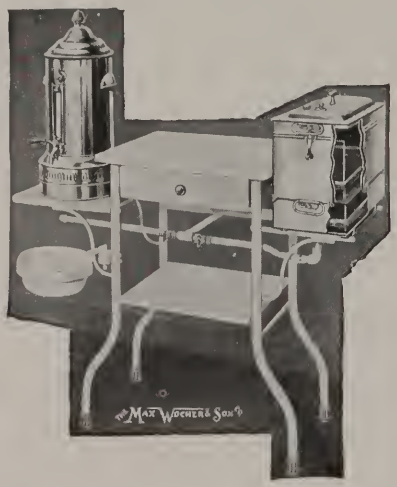


Fig. 56.—Small practical dressing, instrument and water sterilizer for office or small hospital.

Some instruments, as well as some articles used in the operating room will not admit of sterilization either by moist or dry heat without risk of damaging them, as, for instance, those made of rubber, leather, whalebone, bougies, etc. Rubber instruments can be boiled, but care should be taken to see that the rubber is not burned; and if the boiling is repeated too often, the instrument will lose its efficiency by reason of the fact

that it becomes flabby and loses its elasticity. It is better to clean such instruments with soap and water and to immerse them in either a 1:20 carbolic acid solution, or in a solution of bichloride of mercury 1:1000.

Dishes, trays, cups and basins that are made of enameled ware may be cleansed with hot water and soap and placed in a sterilizer and either boiled or sub-

Fig. 57.—Proper way to remove sterile instrument with tray from sterilizer. Pitchers, bowls, trays, etc., in autoclave ready to be sterilized.

jected to a high degree of heat under pressure, or after they have been thoroughly cleaned may be placed in a strong solution of bichloride of mercury or 1:20 carbolic acid solution for one or two hours before using.

All towels, sheets, and other linens used about a surgical patient should first be soaked in 1:3000 solution of bichloride of mercury for two or three hours, then wrung dry and laundered, after which they should be

carefully wrapped and placed in the steam sterilizer in which they remain for three hours; or, they may be subjected to steam for three successive days, sterilization for one hour the first day and one-half hour on each succeeding day.

Gauze sponges, packs, cotton and dressings to be used should be carefully prepared so as to avoid contamination, then wrapped in packages of one dozen small sponges and one half dozen packs with tapes, and placed in the steam sterilizer.

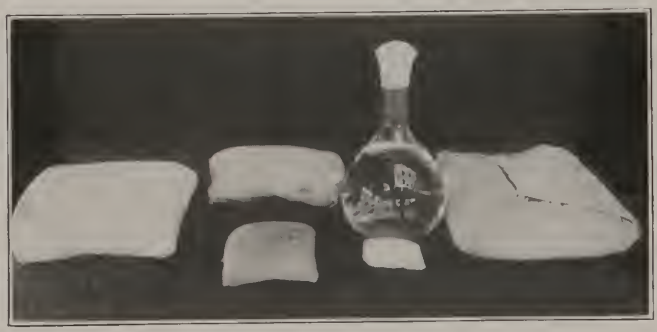


Fig. 58.—Sterile gowns, sheets, sponges, cotton and dressings wrapped in containers, also flask sterile normal saline solution.

The cotton should be made into swabs of convenient size, and the dressings should be so arranged in packages as to suit the case, be it abdominal, perineal, or mastoid; these swabs should be subjected to the same process of sterilization as that used with the gauze, sponges, pads, etc. All safety pins should be sterilized before using.

All soiled dressings removed from the patient, cottons, swabs, and gauze sponges used in cleansing the wound, should be placed in a paper bag and consigned to the furnace.

The excreta should receive careful attention upon the part of the nurse.

All urinals and bed pans should be rinsed with 1:20 carbolic acid solution, and then thoroughly irrigated with warm water before using.

These articles, as soon as used, should be removed from the room, emptied, and carefully cleaned as described above, so as to be ready for use next time.

Chlorinated lime, when fresh, is one of the best agents to use in these receptacles, as free chlorine is liberated and this is highly inimical to living organisms.

Disinfection of a room that has been vacated by a patient should always take place, and should not be occupied by another until the process is complete. This may be done by closing the room tight and burning sulphur candles; this answers very well when other methods can not be employed. The best method, and one used in many hospitals and by some boards of health, is to carefully wipe all woodwork with a damp cloth, and the floor with a carbolic acid solution 1:20, or with bichloride solution 1:1000, using a mop for this purpose; then, plug every opening tightly with cotton and allow a formaldehyde generator to operate for a few hours.

The room should be kept closed for several hours afterwards, then it should be thoroughly aired before using.

This latter process will usually insure against infection of the next patient who uses the room.

CHAPTER V

BEDS

The regulation bed now in use in most hospitals is single and made of iron, and is six feet six inches long, with a double wire spring. The height should be carefully noted in selecting a bed which a patient will occupy. Hospital beds should not be too low or too high—usually about twenty-six inches.

The constant stooping and lifting which necessarily devolves upon the nurse is exceedingly trying when the bed is too low. The weight should not be excessive, as light beds are easier handled and are just as durable as the cumbersome ones sometimes seen in use. All beds should be provided with casters that can easily be removed should the occasion arise. The trained nurse should be well versed in bed making, as a well-made bed is conducive to the patient's comfort.

A well-made bed consists of a covering over the springs, then a mattress, preferably hair, and over this it is sometimes advisable to place a light pad. A rubber sheet is placed over the mattress if the case is one where the bedding is likely to be soiled by discharges; but if this is not likely to happen, it is best to leave off the rubber sheet as it is very warm, and especially so in the hot months. A cotton sheet is next spread and well tucked in at the sides, head, and foot. The patient is covered with another sheet, and a light blanket is thrown across the foot of the bed to be used if needed. In cases where the patient has sustained considerable

Fig. 59.—Regular hospital bed.

Fig. 60.—Hospital bed with back rest, fracture extension apparatus, and elevating rubber wheels.

shock, it is advisable to place him between blankets for a short time until he reacts, when the blankets can be removed, as heat is conducive to a hurried reaction.

The bed may be warmed with hot water bottles, carefully protecting the patient from being burned.

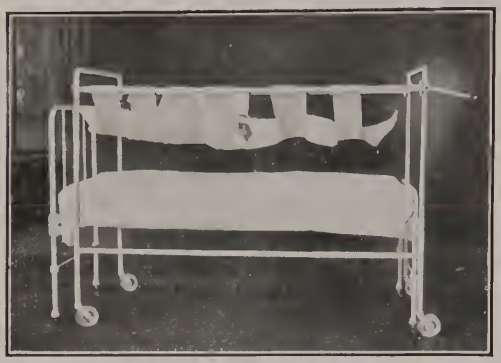


Fig. 61.—Invalid lifter frame to roll over any 36-inch bed.

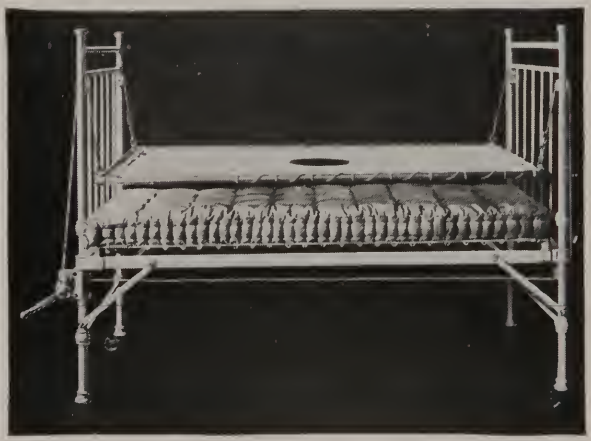


Fig. 62.—The Smith fracture bed or for handling heavy patients.

No thoroughly trained nurse should ever allow this unfortunate accident to occur; she should make fre-

quent examination to see that no part of the patient's body or limbs are in contact with the hot bottle.

Beds are sometimes of special design; as, for instance, those used in treating fractures where some form of extension is to be used. When the regular fracture bed is not to be had, the placing of wide boards beneath the mattress, so as not to permit sagging, will usually meet every indication. Some beds are so constructed as to have an arm extending over the bed to which is attached a strap whereby the patient can assist himself in elevating or turning.

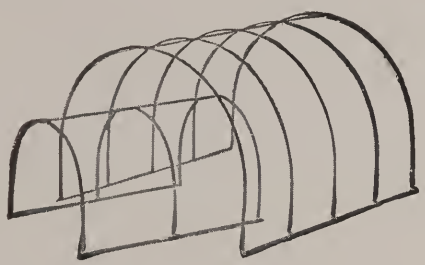


Fig. 63.—Wire cradle used to protect weight of cover from limbs.

A nurse should never lose sight of the fact that patients confined to the bed for any length of time are likely to develop pressure sores unless careful attention is given to the parts of the body which bear most of the weight. The patient should be frequently bathed and thoroughly dried, after which a mixture of pulverized alum, ℥i to one pint of alcohol, should be liberally applied and allowed to dry, then the parts should be dusted with a good quality of talcum powder. Should any redness occur anywhere on the back, elbows, ears, calves of the legs, or heels, especial attention should be given them and in addition to bathing, the parts should

Fig. 64.—Bed in Fowler position on bed elevator.

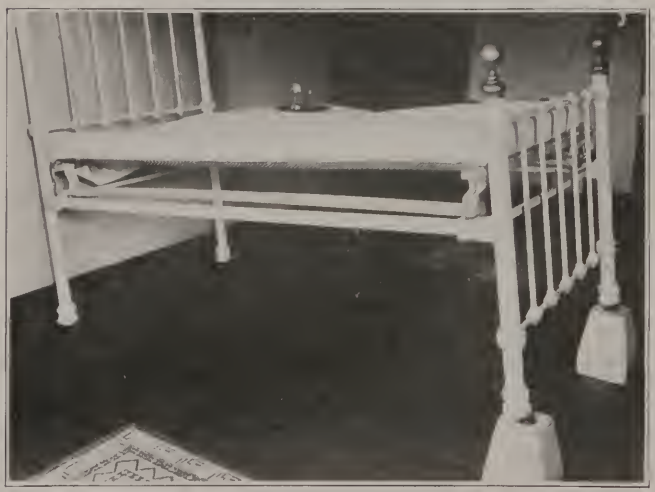


Fig. 65.—Foot of bed elevated on blocks for patient who is in shock and who has lost considerable blood.

be relieved of pressure by either cotton pads or air cushion.

In cases of fracture of the limb or a mashed or bruised member, it is advisable to keep the bed clothes from exerting any pressure. This is best accomplished by letting the covering rest on a wire screen made for the purpose; or, if this is not at hand, an improvised one made by tying the halves of two barrel hoops at a right angle to one another, may be used.

Within recent years, it has become customary in certain conditions to place the bed in an elevated position; as, for instance, Fowler's position, when it is desired to drain secretions away from the diaphragm, as this organ is so well supplied with lymphatics that its power of absorption is very great. This position is obtained either by placing the head of the bed on a table of suitable height and strength or on blocks of wood, or by the use of a specially constructed bed elevator, of which there are several types.

When the bed is so elevated, there is a tendency for the patient to slip towards the foot. This is prevented by placing a wide board at the foot, and allowing the patient's feet to rest against it, the feet being protected by soft pillows; a sling is made by twisting a sheet in such a manner that the patient sits in the center while the ends are tied to the sides of the bed.

In cases where there has been considerable shock and loss of blood, it is sometimes advisable to elevate the foot of the bed, this position considerably increasing the blood in the trunk. This can be done by placing the foot of the bed on blocks or a table.

When the convalescent period is reached and the patient is permitted to sit up, a backrest will be found useful. This should be firmly padded with pillows and so arranged as to prevent any sagging of the costoiliac portion of the patient's body.

CHAPTER VI

SOLUTIONS, MEDICINES, WEIGHTS, MEASURES, ABBREVIATIONS

The surgical nurse is constantly called upon to make use of various solutions both in the treatment of wounds and as disinfectants. It may also happen in the absence of a competent druggist that she be called upon to prepare the various solutions needed, and it behooves her not only to thoroughly understand their action, but to know that many are quite poisonous; and she should have an accurate knowledge of weights and measures lest serious if not fatal mistake be made in their compounding and administration.

The constant experiments carried on in the pharmaceutic laboratories are bringing daily before the surgeon and nurse a number of preparations, some of which possess germicidal properties of undoubted value, while others are worthless. The following are some that have stood the test of time and are in common use.

Bichloride of mercury or corrosive sublimate was first introduced into surgical work by von Bergman. It is soluble in 16 parts of cold water and used in solutions varying in strength from 1:500 to 1:100,000. It is most often used in strengths of 1:1000 to 1:10,000, depending upon the site; as, for instance, in cavities where there is a possibility of absorption taking place, it should be used in weaker solutions. Bichloride is now generally used in tablet form of 7½ grains and the solutions are made by dissolving the tablets in sterile water, the

strength desired being secured or determined by the number of tablets dissolved in one pint of water.

Being one of the most poisonous drugs, the tablets are made in various shapes, and are usually blue in color; this is a precaution, like the use of analine dye to the solution to distinguish it. It discolors linen and corrodes metal instruments left in the solution for only a few minutes.

In preparing a solution, one tablet (7½ grains) when dissolved in one pint of sterile water makes a 1:500 solution, and any further solution may be made from this by the addition of water, depending upon the strength desired. Bichloride, when used constantly, may produce cracking of the skin and discoloration of the nails.

Carbolic acid is a derivative of coal tar, and is used in the form of white crystals which dissolve readily in water in certain proportions; however, an aqueous solution stronger than 5 per cent can not be made. A weaker solution is ineffectual against certain forms of bacteria.

Carbolic acid, when used on the mucous membrane and skin, unless very much diluted, has a decided corrosive action leaving a white eschar.

The late Doctor S. D. Powell of New York City demonstrated that alcohol neutralized the effect of carbolic acid if applied immediately; however, if some time elapses before alcohol can be used, its effect is practically nil.

The strength of the solutions commonly used are 1:20, to 1:80. A 5 per cent solution is made by dissolving 1 part of carbolic acid crystals to 19 parts of warm water, which should be thoroughly shaken to insure its admixture. Carbolic acid is much used in the preparation of vaginal douches, and is not devoid of danger if not

thoroughly dissolved before using; as carbolic acid, being heavier than water, passes out first, causing considerable discomfort if not severe burning.

Lysol and creolin are also made from coal tar products, and resemble carbolic acid in their action; and being cheaper than the latter, they are used extensively as disinfectants. Some obstetricians employ lysol and creolin in their practice.

Acetate of aluminum is used extensively in some hospitals as a wash for wounds. It is used in the form of a solution as follows:

Acetate of lead	38 gr.
Aluminum acetate	24 gr.
Water	1 qt.

Absolute alcohol is also used as a disinfectant, and some surgeons use it in the preparation of their hands prior to any operative work.

Tincture of iodine was formerly used extensively in surgical work. It was used in the form of Lugol's solution. This, however, fell into disuse until a few years ago, when some operators claimed much for the tincture of iodine in the disinfection of the skin of a patient to be operated upon. The skin is painted once or twice before operation with full strength iodine; this, however, is not advisable as it has been found that one half strength answers equally as well and is not so likely to blister, as the skin of some patients is extremely sensitive.

Potassium permanganate is used in saturated solution to prepare the hands and arms of the operator and assistants. It colors the skin a mahogany color which is removed by immersing them in a saturated solution of oxalic acid. Potassium permanganate is also used as a wash in the strengths of 1:500 to 1:5000.

Boric acid is used extensively, and while it is much less effective as a germicidal agent than some enumerated above, it possesses one excellent quality in that it is nontoxic and can be used almost anywhere about or in the body with impunity. It is used in varying strengths up to a saturated solution.

Normal salt solution is used extensively not only during an operation but also to bathe the wounds, as it is nonirritating and nontoxic. Compressed tablets of $16\frac{2}{3}$ grains of pure sodium chloride can be had at most any drug store, and from them a saturated solution can be readily made by dissolving one tablet in four ounces of sterile water; and from this solution other solutions of the desired strength can be made.

The drugs that a nurse on duty may have need for are not many and are always given under the direction of the surgeon in charge, unless in an emergency when she will have to take the initiative and act as her own judgment dictates. A few of the most frequently used drugs in a surgical case are given, and their doses:

Morphine sulphate is an opiate and is given for the relief of pain and in doses of $\frac{1}{16}$ to $\frac{1}{2}$ grain. The latter dose is large, and should be given only in extreme cases, and its effect should be carefully watched. The usual dose required will rarely exceed $\frac{1}{4}$ grain.

Codeine is also an opiate, being somewhat weaker than morphine, and given in $\frac{1}{4}$ grain to $\frac{1}{2}$ grain doses. The phosphate or sulphate is chiefly used; it is said that codeine is less likely to produce nausea than morphine.

Heroine is also a derivative of opium, and is administered in doses of $\frac{1}{16}$ to $\frac{1}{6}$ grain; usually $\frac{1}{12}$ grain will answer in the majority of cases where it is required.

The free use of all opiates is to be discouraged, since not only their toxic effect is dangerous, but the likelihood of patients becoming addicted to their use should not be lost sight of. The United States government has passed a law, known as the Harrison Anti-narcotic Law, which forbids persons, unless they be properly registered with the internal revenue collector in the district in which they reside, from dispensing any form of opiate.

The bromides are used to quiet, and are administered by either the mouth or the rectum. Potassium and sodium bromide are used in doses ranging from 10 to 20 grains by the mouth, from 20 to 40 grains by the rectum.

Aspirin is much used at present to relieve pain. It is made in tablet form of 5 grains each, or may be given in powder form. A combination that is frequently found effective in relieving pain and promoting sleep is 5 grains each of aspirin and veronal; if the suffering is severe and it is not desirable to resort to an opiate, 2 or 3 grains of phenacetin may be added to the veronal and aspirin.

Drugs that stimulate the heart are always to be given with caution. Digitalis is prepared in a number of ways and some of the pharmaceutical houses make very reliable preparations from the crude drug. The tincture is, as a rule, the one preparation that is usually at hand and given in doses from 5 to 15 minims. All preparations of digitalis are at times likely to disagree with the stomach. Strychnia sulphate and strychnia nitrate are usually given hypodermically in doses from $\frac{1}{60}$ grain to $\frac{1}{20}$ grain, depending on the urgency of the case. Black coffee is a most excellent heart stimulant and is administered in doses of from 3 to 6 ounces.

Atropine sulphate is made from belladonna and is

used to check too free perspiration and excessive flow of mucus, often noticed after operation, and also as a respiratory stimulant. It is given in doses of $\frac{1}{100}$ grain to $\frac{1}{200}$ grain, usually $\frac{1}{150}$ grain being the customary dose.

Cocaine muriate is used in solution mostly for local anesthetic purposes and in 1 per cent to 10 per cent strength, the solution usually employed being 4 per cent. This drug at times produces toxic symptoms and should be carefully watched.

Novocaine is a much better preparation as it is just as efficacious and much less poisonous. It is used in $\frac{1}{2}$ to 4 per cent solution. Its principal use is in local anesthesia.

Both before and after every operation the nurse will be instructed to see that the patient's bowels are evacuated. When evacuant enemas are not desired, the surgeon may order any one of the following drugs:

Calomel is a white, tasteless powder made from mercury and may be given in what is spoken of as broken doses; that is $\frac{1}{10}$ to $\frac{1}{4}$ grain every 20 or 30 minutes until one or two grains have been taken. or the patient may take 5 grains at one dose. It is customary to combine an equal amount of soda bicarbonate with the calomel. Calomel is given much oftener in the South than in the North, and in all cases should be followed by a saline cathartic.

Saline cathartics are oftener used and are quicker in their action than calomel. They are magnesium sulphate (Epsom salts) given in one-half ounce doses dissolved in one-half glass water. Rochelle salts may be given in the same size doses for the same purpose.

Castor oil is given in one-half to one ounce doses. This can be given in orange or lemon juice or strong

coffee. Squibb's castor oil is to be preferred, as it is a refined product and less nauseating. It should be given on an empty stomach. A convenient way to administer castor oil is to squeeze the juice of half an orange in a glass, pour in the oil, and squeeze the juice from the other half of the orange over it; some add water and stir, but this makes a bulky mixture which is not desirable.

Many drugs that move the bowels are now put up in palatable form, such as cascara sagrada. This drug is given in doses of from fifteen minims to one dram.

Medicine may be administered not only by the mouth, which is the usual method, but also by hypodermic injection. For this purpose, small soluble tablets are used by dissolving in warm sterile water. The effect produced is much quicker than by the mouth or rectum.

When the stomach is irritable and it is deemed expedient to rest it, medicine can be given by the rectum. This method can not be tolerated by some patients for any length of time, as the bowel becomes quite irritable and likely to expel whatever is placed in it. The dose per rectum is much larger than that given hypodermically or by the mouth. Medicine to be given per rectum may be dissolved in warm saline or sterile water or may be placed in suppositories and, after being greased, inserted into the bowel. The suppositories are so made that they dissolve at the temperature of the body. They are also used in the vagina, and when so administered usually exert only a local effect.

It should be stated, before leaving the subject of drugs, that when a nurse is ordered to give a dose of medicine before meals as a rule it should be taken one-half hour before the meal is served and that under no circumstances should she attempt the administration of

any medicine by the mouth when the patient is unconscious.

The nurse will have handed her, perhaps on more than one occasion while nursing a case, a prescription on which, besides the names of the ingredients there will be certain symbols and abbreviations with which she should be thoroughly familiar.

The following are some of the abbreviations used, as well as the weights and symbols:

Apothecary Measure

60 minims = 1 fluid dram (ʒ i)
2 fluid drams = 1 dessertspoonful
4 fluid drams = 1 tablespoonful or one-half ounce (ʒ ss)
8 fluid drams = 1 fluid ounce (℥ i)
16 ounces = 1 pint (o j)
2 pints = 1 quart
4 quarts = 1 gallon

Apothecary Weight

20 grains = 1 scruple (℈)
3 scruples = 1 dram (ʒ i)
8 drams = 1 ounce (℥ i)

Abbreviations

āā = of each.
ad lib = as much as desired.
Aq. (or aqua) = water.
Aq. pur = distilled water.
Bis iud = twice daily.
C.c. = cubic centimeter.
Cm. = centimeter.
Cum. = with.
Dil. = dilute.
Decub. = lying down position.
Ft. (or fiat) = let there be made.
Fl. = fluid.

Gtt. = drop.
Gr. = grain.
M. = mix.
Mist. = mixture.
P.C. = after meals.
P.r.n. = as occasion arises.
Q.s. = sufficient quantity.
℞ = recipe.
Stat. = immediately.
Sig. = sign or give directions.
T.i.d. = three times daily.
Tr. = tincture.

CHAPTER VII

TEMPERATURE—PULSE—RESPIRATION—BLOOD PRESSURE

That a nurse should be of real service while nursing a surgical case, it is of the utmost importance that she should understand the meanings of the variations in temperature, pulse, and respiration.

The average normal temperature is $98\frac{2}{5}°$ F., or 37° C.; however this may vary in perfectly healthy individuals from $97\frac{4}{5}$ to $99\frac{1}{5}$ F. Any temperature either above or below these figures is indicative of trouble which should be reported to the surgeon in charge. The clinical thermometer now in general use has either Fahrenheit or centigrade scale, the former being the more popular and ranging from 94° to 110°. These instruments are so made that it is necessary to leave them in the mouth from one to three minutes in order that the registration may be complete. Before being placed in the patient's mouth, the thermometer should be carefully washed off with a solution of 1:1000 bichloride mercury, and after the registration is noted it should be placed in either the above solution or some other equally effective antiseptic solution when it will be ready for use next time. A thermometer should never be placed in warm water, for fear of breakage.

There are several ways of taking the temperature: by the mouth, by the rectum, by axilla, and by the sense of touch, though this last method is by no means reliable. It should be stated that when taken by the rec-

tum it may register one-half degree higher than when taken by the mouth; it is usually about one-half degree lower by axilla or groin than by the mouth.

These slight variations should be remembered and in recording the temperature it should be stated whether by mouth, rectum, or axilla. The thermometer should always be shaken down to or below 95° before using.

Temperature taken at irregular intervals, while better than not taking it at all, conveys but little information, and in all cases strict periodicity should be observed. It is a very good rule to take temperature at 8 A.M. and noon, 4 P.M. and 8 P.M. These hours cover sufficient time to catch any abnormal temperature that might arise in the average surgical case. Temperature may come on suddenly or gradually, and may disappear either by crises, as in pneumonia, or more gradually (lysis). The latter is the usual ending in surgical cases, as fevers rarely drop suddenly to normal and remain there. A patient's temperature may be disturbed from many causes, as in cases after operation where there is no pus it is not uncommon to have a temperature of one or two degrees which usually subsides in a few days. This temperature is sometimes spoken of as an "aseptic" temperature, and is thought to, and very probably does, result from the absorption of decomposed products of liberated blood.

In children and young people who undergo operations on the bones or anus, it is not uncommon to find them a short while after operation with a temperature of 102°, 103°; a stitch abscess will cause a rise in the temperature, in an otherwise normal case. This comes on about the fifth day following the operation and as a rule is readily discoverable.

It will sometimes be noticed that patients will have

a subnormal temperature. This condition is usually produced by shock or hemorrhage, and when so produced the subnormal temperature is accompanied by a fall in the blood pressure, all of which indicates imminent danger. In patients after operation where there is a falling in the temperature and rise in the pulse rate, this discrepancy should be reported at once as it means that shock is pending if not already present, and probably death will ensue.

In all septic cases there is usually a rise in the temperature; however the patient may be so exhausted and his power of resistance so reduced that he shows little if any fever. In cases with pus it may be noticed that immediately after evacuation there will be a considerable rise in the temperature; this, however, usually subsides gradually in a few days.

In considering temperature, it is well to state that once in a while there will be found patients whose object is to mislead both the surgeon and the nurse; as, for instance, such practices as holding ice or cold water in the mouth which of course gives a low reading, or they may use hot water, in which case the reverse will be found to be true. Fortunately, cases of this kind are infrequently met with although they are encountered occasionally, and the nurse should be on her guard.

In the convalescent period following an operation, certain complications may develop which will at once cause a rise in the temperature and therefore cause considerable anxiety on the part of the surgeon and nurse. They are tympanitis, menstruation, tonsillitis, erysipelas, pneumonia, or any of the acute exanthemata; also, any of the following may cause a rise in temperature after convalescence has been established, though

not so common as those enumerated above: la grippe, malaria, phlebitis and thrombosis.

A word regarding charting may not be out of place here. Almost every hospital has a different form of chart, though all contain certain spaces for registering the temperature, pulse, respiration, medicine, and diet. The chart should be kept clean and all writing should be in a legible hand and all figures should be distinctly formed. The temperature, pulse, and respiration should be taken at the same hours each day so that the same hour of one day can be compared with the corresponding hour of each preceding day, should this be necessary.

The pulse is one of the best indexes to a patient's condition. In health, the pulse may vary from 70 to 80 beats per minute, 72 being normal in the vast majority of cases. The counting of a pulse correctly is by no means easy in some cases, as the pulse may be very small or small and very soft. The nurse should, in each case she is called to, if the time permits, before operation familiarize herself with the character of pulse and note anything abnormal about it. This puts her in possession of valuable information which comes in nicely in judging the same pulse after operation.

There are several things regarding the pulse which the nurse should note carefully, its frequency, size or any anomaly of the vessels, whether or not it is regular and the tension. As stated above, the frequency may vary considerably.

As to the size of the vessels, it may be said that the arteries in some patients are quite small; also in some patients we find abnormal branching of the arteries, with irregular distribution making the vessel hard to locate.

The pulse may be irregular and skip beats, as in hemorrhage, shock, intense toxemia, or in patients who have chronic endocarditis.

The tension may be low or high; in all conditions that depress the vitality of the patient, such as shock, hemorrhage, extensive traumatism or prolonged surgical operations, the pulse will be found low. A high tension pulse is noticed after exercise, excitement and stimulants; however, if there is no pathologic condition present, it usually subsides. It should not be forgotten by the nurse that the pulse rate and tension is somewhat increased after a meal, while certain medicines will produce the same result.

Preceding the operation, and during the administration of an anesthetic, a rise of from 10 to 30 beats may be noted. If the anesthetic has been properly given and no loss of blood occurs together with little handling of the parts and a short operation, this rise is, as a rule, only temporary. If the operation is prolonged and there has been some loss of blood together with more or less trauma, the pulse may reach 120 to 140 beats per minute.

After an abdominal operation where there has been no complication, the pulse rate will be increased from 20 to 30 beats. This, however, will finally subside, and the normal rate will be reached in from three to five days.

After hemorrhage it will be noticed that the pulse is increased in frequency, but that its volume is not as good as before. This is because the heart is exerting itself to overcome the lessened peripheral resistance. Intense pain will cause an acceleration of the pulse, and in very nervous patients the same can be noticed. Distention with gas following an operation will cause an increase of from 10 to 40 beats, depending on the amount

of distention and the temperament of the patient. In brain abscess, tumor or hemorrhage, the pulse will usually be found to be slow and full.

In connection with the pulse, a few remarks on blood pressure may not be out of place. The nurse may never be called upon to take and record blood pressure; however, a general knowledge of how it is taken and its significance will do her no harm.

The taking of blood pressure by any one of the now well recognized instruments will be found good practice for the nurse, as it imparts valuable information as to a patient's condition when the indicator shows a hypertension or a hypotension.

There are a number of instruments now in use; probably the simplest one is that called "Tycos." It consists of a pneumatic armpiece with two rubber tubes to which are inserted the recording instrument and to the other tube a rubber bulb which so distends the air pad with air that when properly wrapped around the arm will compress it so the radial pulse can not be felt. The finger is placed over the pulse and at the moment it begins to beat, the hand on the recording instrument will point to the figure which indicates the blood pressure.

The normal blood pressure in healthy people may be stated as follows: in children over two years of age, from 85 to 110 mm.; in adults, it ranges from 105 to 145 mm. In females the pressure is usually 10 mm. less than in males.

Blood pressure may give valuable information to the surgeon before operation, in estimating the efficiency of the heart. During the administration of an anesthetic

it serves as one of the most reliable sources of information regarding the heart. Early warning of impending shock is obtained by this method, so that proper measures may be instituted to revive the patient.

In chloroform anesthesia, all but 10 per cent of the cases show a fall in blood pressure from 10 to 40 mm. Ether causes, usually, a rise in the blood pressure up to the point of saturation of the patient, then a fall will be noticed. During an operation, the blood pressure

Fig. 66.—Tycos blood pressure instrument.

should be taken every 10 minutes. This gives the surgeon and anesthetist ample time to use any measure that may be deemed advisable.

The surgical significance of blood pressure may be stated in a very general way; as, for instance, operations on the scalp, face, or mouth cause very little irregularity in the blood pressure; on the other hand, operations on the skull, dura or brain are usually followed by a considerable fall; this, however, depends

largely on the length of the operation and also on the amount of manipulation of the brain.

In amputations of the breast, a slight fall may be observed, and in empyema a decided and rapid fall occurs.

In all abdominal operations there is a tendency towards a decline. This, also, depends upon the time consumed and the traumatism inflicted.

Operations on the extremities may show no marked change, unless accompanied by extensive trauma.

The following are a few conditions that usually cause the blood pressure to rise:

Arteriosclerosis
Chronic nephritis
Cerebral hemorrhage
Emphysema
Eclampsia
Pregnancy
Toxemia

The following are a few which show a variable pressure:

Cerebral tumor
Exophthalmic Goiter
Jaundice
Menopause

The following usually cause a low pressure:

Anemia
Diabetes
Exhaustion
Hemorrhage
Shock and Collapse

Respiration

Much may be learned regarding a patient's condition by systematically recording his respiration. This should be done at the same time the temperature and pulse are taken. The average adult in good health will breathe about 16 or 18 times per minute, while in children a respiratory rate of 20 to 26 is not incompatible with a healthy condition. Certain causes, such as exercise or excitement, while not associated with a diseased condition, may cause an acceleration of the respiratory act.

In hemorrhage the respiration may be hurried and sighing, while in pulmonary embolism it may be rapid, shallow, and gasping in character. In peritonitis, the respirations are nearly always increased and may run to 40 or more per minute. The abdomen is tense, and acts as a splint to the inflamed area therein, and if the case gets progressively worse the respirations become entirely thoracic in character.

In case the abdomen becomes distended, due to an excessive accumulation of gas in the intestines, the respirations are increased. They, however, subside and become normal again after the cause has been removed.

A careful respiratory record in a case that has been operated upon may warn the surgeon of an impending pneumonia, a not infrequent postoperative complication.

The nurse should observe whether or not the respirations are regular, their frequency, and their character—such as, deep or shallow, or noisy. All of these are invaluable and it is the nurse's duty to so record them.

CHAPTER VIII

ENEMAS, DOUCHES, AND CATHETERIZATION

Enemas are used to supply water to the system; to administer medicine, either for sedative, stimulating, or astringent purposes; for evacuating the bowels; and for nutrition.

The several kinds of syringes used for this purpose are the fountains, Davidson, hard rubber, and the bulb syringe. The fountain or Davidson syringes will be found best suited in the majority of cases; however, when an oily substance is to be injected in small quantities, the hard rubber syringe will be found useful. The bulb syringe holding 2 to 4 ounces is especially adapted for very young children.

As to the administration of enemas, the nurse should keep in mind the purpose for which it is given. The solution should be placed in the fountain syringe, if this type is to be used, after it has been previously prepared in a pitcher, the temperature of the solution injected depending on the purpose for which it is used.

The patient is placed on her left side, with her hips elevated with one pillow; the knees should be flexed, or she should lie on her back with her limbs drawn up; or, if for any reason it is desired to let the fluid ascend high in the colon, the patient may be placed in the knee-chest position. The anus is greased with vaseline as well as the nozzle of the syringe. The air is permitted to escape from the tube before inserting the nozzle, so as not to cause pain and possibly expulsion of the

enema before the desired time. The fluid should be permitted to flow slowly, and after all has been given a towel folded should be pressed firmly against the bowel, thus helping the patient to retain the enema. In inserting the nozzle, the nurse should be gentle, never

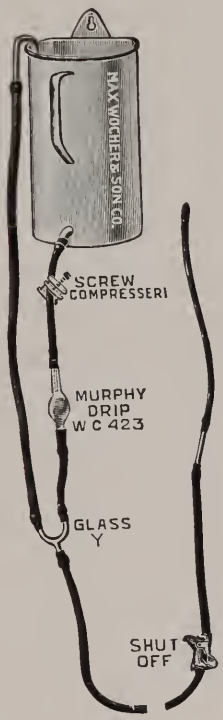


Fig. 67.—Improved Murphy drip outfit with white enameled can, used to administer normal salt solution. The flow can be regulated by the screw compressor.

forcing it, as the mucous membrane of the rectum is easily damaged. The amount injected in adults will vary from one pint to four pints, and in children from

one-half pint to one and one-half pints. In infants and very young children, from one to four ounces will be found sufficient.

When it is desired to supply water to the system, it may be given in quantities from one-half pint to one and one-half pints of warm water, usually one pint being sufficient, as often as directed by the surgeon.

In cases of shock, when it is necessary to fill up the blood vessels due to loss of blood and also to increase the action of the kidneys, it is customary to give normal salt solution by the rectum (proctoclysis). It can be given by the continuous drop method or six ounces every three or four hours can be administered over a long period of time.

When the enema is used to evacuate the bowels, any one of the following may be used: Soapsuds enema, or an enema of turpentine.

Soapsoads,	1 pint
or	
Glycerine,	
Epsom salts,	āā ʒ ii
Warm water,	1 pint
or	
Glycerine,	
Salts,	āā ʒ ii
Turpentine,	ʒ i
Warm water,	1½ pints
or	
Glycerine,	ʒ ii
Warm water,	1 pint

In using turpentine in an enema, the solution should be thoroughly shaken before using.

When medicines are ordered to be given by the bowel, they are usually written down and definite quantities of the particular drugs are stated; if the medicine happens to be an oily substance in small quantity, say four ounces, it may be injected by means of a hard rubber syringe; if, however, it is desired to control hemorrhage as an astringent, it will be found best to use either the Davidson or fountain syringe. Drugs such as the bromides, chloral and stimulating enemas can best be given with the latter syringes.

In nutrient enemas in adults, the rectal tube should be used and in children either the infant rectal tube or soft rubber catheter will answer. In this connection it may be stated that it is not necessary to pass a tube farther than 6 or 8 inches, as it is likely to coil upon itself. In giving a nutrient enema, it is necessary that the bowel be empty and also that the hips be elevated as much as is consistent with the comfort of the patient, since the higher up the bowel the more rapidly will the enema be absorbed.

While every surgeon has his own formula for nutrient enemas which he is accustomed to use, a few will be given below that have found favor among many surgeons: These were taken from Crandon's *Surgical After-treatment*, page 126, and may be varied to suit the individual case.

3 eggs beaten in
Peptonized milk, ℥ iii
Salt, 2 or 3 pinches

Milk, ℥ iii
Eggs, 2 or 3
Salt, 2 or 3 pinches
Red wine, 1 tablespoonful

Dry peptone,	
Sugar of milk,	āā ℥ i
Alcohol,	℥ i
Tr. opium,	gtt x.
Water, q.s.	℥ ix

By *douching* is meant the directing of a stream of water against some part of the body. It is usually spoken of in connection with the vagina, ear, or nose.

For the ear, a small rubber bulb syringe called an "ear syringe" is usually employed; however, if this is not at hand, the fountain syringe can be used, caution being taken not to use too much force, this being controlled by the height to which the syringe is elevated.

In the use of the nasal douche, either the "nasal douche" is used, or the solution is sprayed through a specially constructed syringe by means of compressed air. In both nasal and ear douches, their employment is for cleansing, relieving congestion, relieving inflammation, and either stimulating, astringent or soothing as the case may be.

When a douche is used in the vagina or uterus, the fountain syringe or irrigating can had best be used. It may be intended for cleanliness, to relieve congestion or to check hemorrhage, astringent, and to remove debris. The nurse will often be called upon to give douches, except perhaps the uterine which is given by the surgeon, or his assistant. In giving the douche, the nurse should give strict attention to the same rules as to gentleness and cleanliness as she observes in her other work.

To give a vaginal douche, the patient is placed on her back and a douche pan is placed under her hips; the nozzle is inserted gently into the vagina, when the solu-

tion with which the syringe is filled is permitted to flow. In ear and nose douching, either normal salt solution, boric acid solution, or sterile water are commonly used.

In vaginal and uterine douches, very hot sterile water at 116° F. is used to control hemorrhage as well as astringent solutions such as tannic acid or alum. As an antiseptic vaginal or uterine douche, carbolic acid solution 1 :80 or bichloride of mercury 1 :5000 to 1 :10,000 strength may be used.

Catheterization is the process of drawing the urine from the bladder.

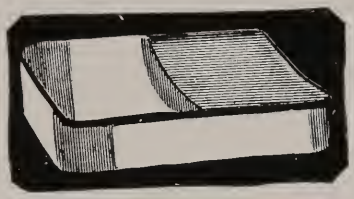


Fig. 68.—Porcelain enameled douche pan.

It not infrequently happens that after an operation the patient can not empty the bladder. This causes great discomfort and the duty devolves on the nurse to relieve the distress by catheterization. In some cases the nurse may have to practice this only once or twice, then again it may be necessary for some time. Operations upon the rectum or pelvic organs sometimes cause retention, then again some drugs will cause it, as, for instance, morphine. The position in bed causes retention in some cases, as voiding urine while lying on the back is at times quite difficult. Patients should be encouraged to pass the urine if it is at all possible.

Much care should be taken by the nurse to cleanse

her hands as she would for an abdominal operation as chances for infection are at all times great. She should have the patient lying on the back with the knees drawn up and limbs separated, and in a good light. The vulva is washed with warm sterile water and green soap; after this, the parts should be washed with an antiseptic solution 1:10,000 bichloride of mercury, carefully cleansing around the meatus. The boiled glass catheter is taken with the gloved hand of the nurse and

Fig. 69.—Tray for catheterization of patient.

gently inserted into the meatus and bladder. The bladder emptied, the parts are sponged with cotton dipped in the antiseptic solution and all catheters are scrubbed and then boiled and kept in 1:5,000 bichloride solution until used next time.

Catheters are made of glass, silver, soft rubber, and elastic. Of these the glass and soft rubber will be found best, as the silver catheter can not be properly sterilized and the elastic ones do not stand boiling well;

however, the glass and soft rubber ones have none of these disadvantages.

The chances for infection are, as stated above, very great, and scrupulous cleanliness of patient, instruments, and nurse must be observed. Cystitis arises from infection, which may extend up the ureters to the kidneys, causing a pyelitis or pyelonephritis and possibly suppression or death. In nervous individuals, the passage of a catheter may cause a certain amount of shock which usually passes off in a short while, or if infection takes place, to the shock is added fever and chill. Catheterization should, in the average case, be done every eight to ten hours. The nurse should be exceedingly gentle, and especially if any plastic work has been done on the vagina, in order that she may not produce an undue amount of pain or allow the urine to infect the stitches, or the secretion from the wound to infect the bladder. A well-trained nurse should be able to pass a male catheter with the same ease and dexterity that she does a female.

In catheterizing a male patient, the same rules as to cleanliness of the nurse, instruments, and patient are to be observed. The catheters are either steel, silver, or soft rubber. The soft rubber catheter should, if possible, be used, as it is less harsh to the mucous membrane of the urethra and more certainly sterilized. In the passage of the catheter in the male, it may meet with some resistance at the neck of the bladder. This is in all probability due to a spasm of the sphincter and may be overcome by gentle and steady pressure. In cases where a known obstruction exists, as in prostate cases, the surgeon should instruct the nurse how to pass the instrument, as well as to the particular kind of instrument to use.

CHAPTER IX

URINE AND BLOOD

In considering the urine and blood, only such facts will be set forth as will be of practical value to the nurse. While the examination of either is usually done by those especially trained and in a well-equipped laboratory, the knowledge of certain facts regarding the urine and blood of a surgical patient will enable the nurse to form more accurate observations and conclusions as to the condition of the patient.

The amount of urine passed by a healthy individual in twenty-four hours is about three pints. This is influenced to a certain extent by the amount of water taken into the system, the amount of perspiration, and of water given off through the lungs. Besides the physiologic variations many diseases have a decided influence on the quantity of urine excreted; thus, in diseases of the circulatory system, the quantity is usually diminished, also in acute and sometimes chronic nephritis, acute fevers and toxic conditions. Certain drugs known as diuretics also increase the output of urine, as citrate of potash—diuretine, or sweet spirits of nitre.

The color is usually straw or amber color, though this may depend upon the degree of concentration. Certain drugs, such as carbolic acid, will produce a dark green or black color; salicylic acid a green, and rhubarb a brown or red color. Also, some of the analine dyes, used as medicines, such as methylene blue, will impart this color to the urine.

In certain diseased conditions of the kidneys, ureter, bladder or urethra, blood may be found in the urine, which imparts a reddish tinge. Bile may be present from jaundice or other diseased condition of the biliary tract, in which case the urine will have a yellow or greenish hue.

The consistency of normal urine is always aqueous, but not infrequently in diseases of the genitourinary tract it may be thick and ropy. This may be noticed in cases of cystitis, pyelitis, etc., and is due to the presence of an excessive amount of mucus or pus or both.

Thus it will be noted that the urine has certain characteristics which are discernible to the eye, and it is the duty of the nurse to watch each specimen voided, if possible, and to note on the chart any marked changes from the normal.

If urine is examined both chemically and microscopically, certain substances may be found which usually indicate diseased kidneys. In this chapter, mention will be made of only the more important things found with the microscope, and only the tests commonly used for albumin, sugar and the method of taking specific gravity will be given.

With the microscope, casts are found, also blood cells, crystals of various shapes, sizes and kinds, bacteria, and extraneous matter. To discover these and to differentiate one cast, cell, bacteria or crystal from another requires more time, knowledge, and experience than the average surgical nurse has been able to spare from her work.

The specific gravity of normal urine may be put down at 1.018 for an average amount of 48 ounces in 24 hours. But as this quantity is by no means fixed, while that of the solid remains about the same, the specific gravity

must vary accordingly, as when the skin is not secreting actively and when plenty of water has been imbibed the specific gravity may be lowered to 1.005; while on the other hand where there is an active secretion of the skin along with watery evacuations from the bowels, the urine becomes more concentrated and the specific gravity may reach as high as 1.030.

The instrument used in testing the specific gravity is called a "urinometer." It has a graduated scale ranging from 10 to 60. A large test tube is filled ⅔ full of urine and the urinometer is placed in it. The

Fig. 70.—Things necessary in making urinalysis. Microscope, chemical reagents, graduate, urinometer, and funnel for filtering urine.

exact place on the scale to which the urinometer rises will indicate the specific gravity.

The test for albumin in the urine is made as follows: Place about 2 or 3 inches of urine in a test tube and heat gently. Should the urine become turbid it is due to either albumin or earthy phosphates; if the latter are present, a few drops of acetic acid will cause the urine to clear up; if albumin is present, the turbidity will remain after the acid has been added.

The nitric acid test is made by placing in a test tube a small quantity of nitric acid then overlay the acid with urine by allowing it to flow very slowly down

the side of the test tube. At the junction of the urine and nitric acid, if albumin is present, will be formed a white ring.

The test commonly employed for sugar is Fehling's.

Fehling's solution consists of a mixture of cupric sulphate, Rochelle salt and caustic alkali. As it is likely to decompose, the solution is put into separate bottles, in one the cupric sulphate, and in the other the Rochelle salt and alkali. To make the test for sugar, pour into a test tube an equal amount from the two bottles, then dilute by adding water enough to double the quan-

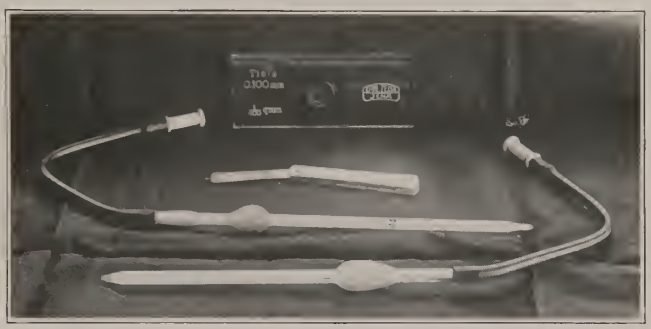


Fig 71.—Glass tubes used in counting red and white blood cells, also needle used to prick finger—drop of blood is placed in center of glass slide which is put under microscope and then counted.

tity. Boil thoroughly and add a little of the suspected urine. If sugar is present, it will give a yellow color and a red precipitate of copper will be found in the bottom of the test tube.

Acetone is found in the urine in many cases, and often accounts for obstinate vomiting which may, in some cases, be erroneously attributed to the anesthetic. Soda bicarbonate per rectum, if it can not be retained by the mouth, will usually effect a cure.

After nursing many surgical cases and watching repeated examinations, the nurse will come to understand

their significance: thus, those patients who show bad condition of the kidneys are generally bad surgical risks, and especially so if a general anesthetic is to be given.

Much that is of invaluable service to the surgeon has been learned, of late years, from the examination of the blood. In the consideration of the blood picture, there are four things to be considered in a systematic examination: First, hemoglobin; second, red blood cells; third, the white blood cells; and fourth, the differential count.

The hemoglobin is the coloring constituent of the blood and one of the indices of health. Normally, it is about 90 to 95 per cent.

The red cells are the oxygen-carrying elements; normally, the number per cubic millimeter is 5,000,000 in men and 4,500,000 for women. A deficiency in the red blood cells with a decrease in the hemoglobin is known as "anemia" and an increase in these is called "polycythemia." The causes of the former are numerous, among which are hemorrhage, malnutrition, chronic diseases, syphilis, tuberculosis, malignancy, and septic conditions. Nothing is as yet definitely known as to the cause of polycythemia.

The white blood cells constitute the army of defense which the body possesses against an invasion of pathogenic bacteria. Normally, the number of white blood cells may vary between 6,500 to 10,000, and an increase above that number is called a leucocytosis, and any decrease is called a "leucemia." If in a patient the blood examination shows a leucocytosis, it generally means either a collection of pus or an acute infection such as appendicitis, cholecystitis, pneumonia or other toxic conditions.

CHAPTER X

APPLICATIONS TO THE BODY

(Cold—Heat—Bier's Hyperemia—Lotions—Counterirritants)

In considering applications made to the body, it must be understood that in this chapter only those usually used externally will be discussed. The practice of applying different things to the body of a patient is an exceedingly old practice, dating far back into the history of medicine and surgery. The applications used by the ancients, and it may be said in more recent years, were at times exceedingly painful and disagreeable, if not in some instances positively dangerous.

Applications are used either hot or cold. Hot applications are used in debilitated and old people to raise the body temperature also to produce sleep as by the relaxing effect of a hot bath. In cases where the kidneys are inactive, either hot baths or hot packs will be found serviceable by producing profuse perspiration, thereby relieving the system of effete material that would otherwise be detrimental to the health of the patient. Heat in some form, usually fomentations, is employed to relieve congested and inflamed parts. When thus used, the soothing effect of hot moist heat is due to the fact that more blood is drawn into the part involved, thereby relieving some of the tension.

When the inflamed part has reached the stage where the swelling and redness is intense, the peripheral vessels may be so impaired that suppuration is inevitable,

in which case the free use of moist heat will hasten the latter process.

Heat is used to equalize blood pressure, also in some skin affections. In these conditions, the bath should be the method of choice. In combating shock and collapse, heat is a most valuable remedy, and should always be resorted to; either hot blankets or hot bottles will be found best for this purpose.

Heat may be applied either moist or dry, and in the following manner:

Hot water
Hot fomentations
Hot compresses
Hot poultices
Hot water bottle
Hot bricks
Hot salt or sand
Hot cloths
Hot air

Hot water may be applied by pouring over the part affected hot water from a pitcher or other receptacle, or by submersion in hot water.

Hot fomentations are used extensively, as this is not only very effective, but a cleanly manner in which heat can be applied. A large, heavy cloth or bath towel is best to use by soaking in boiling water from which it is removed and placed in a wringer especially constructed for this purpose, and wrung dry. The part of the body to which it is to be applied is exposed, the towel or cloth is taken from the wringer quickly, and placed over the part, this in turn being covered by a large, thick, dry cloth, and the whole is enveloped in

either a large piece of rubber or oil silk. This causes the retention of the heat for a longer time. These should be applied every twenty minutes to be effective, and under no circumstances should the nurse permit them to get cold.

Where smaller areas are involved and where the fomentations can not be conveniently used, compresses made of cotton or thick flannel will be found quite adequate; these, however, require frequent changing. Two should be used, so as to have one always ready for application the moment the other gets cool.

Poultices are much used when moist heat is desired, and are made usually of flaxseed, bread, or meal. Poultices have no advantage over either hot fomentations or compresses except that they retain the heat longer. When a poultice becomes cold it should be removed and a fresh one applied. All poultices should be made fresh each time, not using the same one twice. To make a poultice, place the flaxseed in a cup, pour in enough boiling water to make a paste, then heat and stir for a short while and spread thick between layers of cheese cloth or light cotton. Sometimes a few drops of carbolic acid are added; also, several drops of laudanum may be added for its soothing effect. However, as the virtue of the poultice lies in its heat, it is questionable if the addition of the latter adds anything to its efficacy.

In the application of dry heat, the use of thick towels or flannel will be found of service, as they are easy to apply and are of considerable benefit in joint affections. Hot water bottles are convenient and do not require changing so often; they are made of rubber which is the best to use, or of tin, which is in use in many hospitals, as they are cheaper and last longer. Glass bottles are also frequently used; however, these are not so

good as either rubber or tin, as they are more likely to break and cut the patient. In the use of the rubber, tin or glass hot water bottle, care should be taken by the nurse to see that it is not too full and that it is tightly corked for fear of leakage.

Hot bricks, salt, and sand are used for practically the same conditions that the hot water bottle is used, and have no advantage over the latter and should be used only when a hot water bottle can not be procured.

In the application of hot air, the nurse will seldom be called upon, as this is used by the surgeon and is applied by means of an especially constructed apparatus. The limb, or part of the body to be treated, is placed in an oven or hot air chamber where the temperature is raised to a desired degree. The hot air treatment of joints either from trauma or disease is now well recognized.

The application of cold to the surface of the body produces a somewhat different effect, as might be expected. While heat relaxes, cold contracts. It is used to reduce the temperature, as in cases of sun stroke or fevers; in either case, the submersion in a cold bath, or ice applied to the head, or if the case be extreme, the patient may be placed in an ice pack.

In the early stages of congested or inflamed surfaces, cold, when applied, may check the process, thereby avoiding the possibility of suppuration. Cold may be applied to the body by means of the ice cap, ice coil, or ice cloths. If the ice cap is to be used, it should not be too full, the air should be expelled as far as possible, and the cap should fit perfectly so as not to leak. The ice coils consist of a number of coils so wound on a rubber cap as to fit the head and through which constantly flows a stream of cold or ice water; this is not

so practicable or convenient, in many cases, as the ice cap and is less frequently used.

Ice cloths may be applied to any part of the body, the size to be used depending on the part of the body affected. They should be applied often.

In the application of cold to the body, especially when an ice cap is used, it should not be allowed to stay on for an extended period of time, and should always have a thin towel between the cap and skin. A practice regarding ice caps in many hospitals is to apply for two or three hours, and then remove it for one hour.

Lotions, sometimes called by the less dignified name of washes, are medicated solutions in varying strength and are applied to the surface of the body or limbs, mostly for their soothing effect. They may be applied either hot or cold, on a piece of lint or gauze, which is spread over the area involved.

Counterirritants are such medicines as tr. iodine, musterole, ammonia, cantharides, turpentine, ether, chloroform, and the Paquelin cautery. The object in using a counterirritant is to relieve deep-seated inflammation by attracting the blood to the more superficial layers. Tr. iodine and ammonia, when applied without enveloping the part in a bandage causes little more than a redness of the skin; however, when applied in full strength, and the air is excluded, they may readily blister. Mustard, either in the form of a plaster which is made by mixing one part to five parts flour to which may be added enough warm water to make a thick paste, is spread between two layers of linen or some thin material and applied, or, the ready made mustard leaves found in all drug stores will blister if left on long enough. The same is true of cantharides. When either of these is used, its action should be

carefully watched by the nurse, as some skins blister very easily. Other counterirritants, such as turpentine, ether, chloroform, and croton oil are seldom used for this purpose; however, their action on sensitive skins is prompt, often producing severe blisters.

The actual cautery may be used either in the form of cautery irons heated to red heat, or the Paquelin cautery, which consists of the cautery proper with a platinum point and a rubber bulb and tube. Benzine is placed in the cautery and lighted, after which the heat is kept going by the intermittent pressure on the rubber bulb. The cautery is more stimulating and its action is more prompt than that of other counterirritants. The cautery is useful around diseased and inflamed joints, especially those with a small amount of effusion into the joint cavity; in muscular conditions such as lumbago, and in spinal affections it will be found serviceable.

Bier's hyperemic treatment, as it is called, is designed to produce a local, artificial hyperemia. This is done either by a rubber band around the affected part and proximal to the wound, or by the use of cupping glasses or by means of hot air.

Bier's treatment is based on the principle that a congested and inflamed area is not necessarily a diseased condition, but an effort on Nature's part to assist the body in repelling the invading organisms.

When the rubber band is employed, it is placed just tight enough not to stop circulation, as this is the most important point to be watched in the carrying out of this treatment.

The cupping glass is placed over the inflamed part and the air is removed by means of a small suction pump or syringe, thus causing a vacuum.

The hot air is applied by placing the body or limb in an oven made for the purpose.

This treatment is of greatest value when the condition is recognized and treatment instituted at once. In cases where pus has formed, it should be evacuated and the treatment then applied will necessarily cut short the disease.

In general it may be said that acute infectious processes require a much longer application of the hyperemic treatment each day than in chronic cases.

The nurse is referred to Bier's book on this subject, which she may read with profit as its application is not hard; especially is this true after she has been shown a few times. However, it is all important that she should grasp the principles underlying the treatment.

CHAPTER XI

PREPARATION OF PATIENT FOR EXAMINATION

The preparation of a patient for examination is a most important procedure when properly carried out. The importance of the nurse during any examination should not be underestimated, as much, if not all, the responsibility of a patient's being properly prepared rests upon her. She should know in advance what portion of the body is to be examined and if possible the object to be attained by the surgeon from such an examination.

In office practice, the patients will usually be able to walk and to assist themselves to a certain extent. The patient is placed upon an examining table, the clothing being either removed (in which case the patient is covered with a sheet kept for that purpose) or loosened sufficiently to permit of easy access to the part of the body to be examined. If in the hospital or in their homes, a bed is used instead of the table. The bed should be made firm by placing two wide boards under the springs to prevent sagging. If the pelvic organs or the rectum are to be examined, the patient can be brought either to the side of the bed or the hips to the edge.

If the chest is to be examined, the patient should be stripped to the waist, and allowed to either sit, stand, or lie down, according to the desire of the surgeon. The remainder of the body is protected from exposure by a light blanket or sheet.

If the field to be examined is the abdomen, it should be thoroughly exposed, the rest of the body being protected by two sheets, one over the chest and the other spread from the pubis down, covering the entire lower extremities. If one of the limbs is to be examined, the clothing is removed, and the remainder of the body is so draped with a sheet as to prevent unnecessary exposure. In the examination of all patients, the preparation should be carried out in a quiet and orderly way, at no time allowing the patient to become nervous, as examinations of patients in a highly nervous state are, as a rule, not satisfactory.

The history of the patient is taken by the surgeon who may request the nurse to do the writing for him, or he may have regular forms or history sheets which he keeps on file in his office for future reference. The form given here is one which embraces all the important

Name Age Color W-B Date ad. Dsc.
Residence

Married Single Occupation
Children

Family History

Personal History

Present Illness

Phys. Exam. URINE—Color Sp 'g Sed
Albu Sugar
Micro Ex.

Diagnosis

Treatment Advised

Operation

points in a patient's history and has been found convenient.

The urine should be examined in all cases both chemically and, when possible, microscopically; also, the amount of urine voided in twenty-four hours should be known. This information is important in estimating the kidney function, as the exact condition of the avenues of elimination should be known in anticipation of any operation or treatment undertaken.

The blood should be examined, as well as the blood pressure taken. If there is a suspicion of pus or general infection, a blood count should be made. The feces should also be observed by the nurse, its color, consistency, worms, blood, or anything abnormal or unusual should be placed on the chart.

The foregoing applies in a general way to all examinations. However, as the nurse will be called upon to attend women and as a majority of their troubles are pelvic, it will be most proper to speak here, at some length, of gynecologic examinations, their aim, and some of the conditions commonly met with.

A gynecologic examination has for its purpose the acquiring of certain facts regarding the female generative organs, that the surgeon may be able to make a diagnosis of the trouble.

The patient should receive a warm tub bath, if able to leave the bed; if not, a sponge bath, all soap being removed and the skin thoroughly dried. The bowels should be thoroughly evacuated by giving a cathartic the night before, or an enema of soap suds several hours before the time for the examination. Should the patient retain a portion of the enema, it should be withdrawn by means of a rectal tube.

The bladder should be emptied a short while before

the examination, and if for any reason the patient can not void, she should be catheterized, using all precautions against infection. Should catheterization be necessary, it will be well for the nurse to have at hand a four ounce sterile bottle and cork, in order that a specimen direct from the bladder may be had should the surgeon ask for one. After the bladder has been evacuated, a douche should be given, noting carefully before its administration any discharge and its character. The douche used may be 1:10,000 bichloride of mercury, carbolic acid solution 1:80, or normal saline solution. The nurse should find out from the surgeon what position he wants the patient in, whether standing, dorsal, dorsal elevated, Sims, knee-chest, lithotomy, Trendelenburg, or horizontal—these are called the gynecologic positions. The patient is, of course, protected by a sheet, and should wear leggings that come well past the knees.

If the standing position is used, the patient is told to stand, placing the right foot on a low stool or chair steadying herself by holding to the back of the chair. The skirts are rolled up and pinned, a sheet being dropped from around the waist to the floor in such a manner as to leave an opening at the side for the insertion of the examining hand. This position is sometimes used to determine the amount of prolapse or displacement of the pelvic organs.

In the dorsal position, the patient is placed on her back with her hips at the edge of the table or bed, her feet resting upon foot rests if a table is used, and on a chair or supported by the nurse if she is in bed; her thighs and legs are flexed upon the abdomen.

The dorsal elevated position is the same as the dorsal position, except a hard pillow is inserted under her head

and shoulders. In either position a sheet is folded around both limbs and across her abdomen in such a manner as to expose only the vulva.

In the Sims position the patient lies on her left side with the left hip at the edge of the table or bed, with her left arm behind her, both knees drawn up with the right slightly in advance of the left. Drape a sheet over the limbs and abdomen, and separate the edges of it to expose the vaginal outlet.

In the knee-chest position, the patient rests on her knees, which are drawn well toward her chest and separated slightly, the chest being in contact with the bed while her face is turned to one side. Place a sheet over the hips, and separate it in order to expose the gluteal cleft.

The lithotomy position is used only in operative work, and is that position in which the patient lies on the table in the same position as the dorsal except the feet rest in stirrups fastened at the end of the table.

The Trendelenburg position is that in which the patient lies on a table so arranged that it breaks at the knees, permitting them to hang over, while the table is tilted so that the knees are at the highest point. This position is useful in operative work in the pelvis, as it permits the intestines to fall away from the field of operation.

The horizontal position is where the patient lies flat in the bed upon her back with her head on a pillow, her arms placed by her side.

The preparation of the patient for examination, and the different positions having been described, it is well that the nurse should know what instruments and solutions would be needed, and how to arrange them so that they will be convenient to the surgeon.

A small table, over which have been spread sterile

towels, is placed on either the right or left side of the surgeon. On this should be placed one pair dressing forceps, one pair volsellum forceps, one bivalve speculum, one Sims speculum, one uterine sound, one sound for the bladder, one glass catheter, one pair rubber gloves, and two or three applicators, all these having been previously sterilized by boiling, and a small jar in which are sterile cotton balls, and a small jar of sterile vaseline. The solutions chiefly used in a gynecologic examination are 1:10,000 bichloride of mercury or sterile water and a basin of hot water with soap and brush. This last the surgeon uses to cleanse his hands, after which he immerses them for a short while in the bichloride solution and then puts on the gloves. The patient lies on her back with her hips at the edge of the table or bed. Her body and limbs are draped with the sheet so as to expose only the vulva, the surgeon sits on a chair or stool facing her. Should the examination be conducted after night or in a room with a poor light, an electric light with a long cord should be at hand.

In cases where an examination is to be made upon a patient in great pain, shock, or where the patient's condition is such as not to permit of much handling, under these conditions the nurse will find that the routine preparation is not advisable and only such sponging as will insure reasonable cleansing of the parts to be examined should be undertaken.

Where patients are brought into the hospital or their homes suffering from a crushed, lacerated, or broken limb, the nurse should, after the patient has been placed in bed, cut the clothing with a pair of scissors so as to furnish ready inspection of the part. She should have a basin of warm solution of bichloride 1:5000, cotton swabs, one pair sterile tissue forceps, and one pair sterile rubber gloves for the surgeon.

CHAPTER XII

PREPARATION OF PATIENT FOR OPERATION

The preparation of the patient for operation, it matters not what the character of the operation will be, has a very considerable influence on the patient's condition subsequent to the operation. Particularly is this true in goiter and prostatic cases, and where there is anemia due to hemorrhage from fibroids, gastric or duodenal ulcer. It will no doubt be recalled by the nurse, if she has had the opportunity to observe many surgeons' work, that the manner in which the patient may be prepared for operation varies considerably. Some surgeons will prescribe a long, preparatory treatment, while others equally good require a very short and simple course; the nurse will also recall cases operated upon with little if any preparation who do nicely. There are certain dangers in either extremes; as, for instance, in those cases that have been subjected to a long and severe preparatory treatment, there is danger of impairment of the strength by confinement to the bed, weakened by excessive purgation, and last but not least, they become nervous and impatient by the long wait before the expected day of operation. Or, in cases that have been given very meager preparation, there is danger not only in infection, but the condition of the excretory function is in all probability not known. No case except the worst emergencies should be operated upon without some attempt at preparatory treatment, and these, of course, receive some preparation on the operating table. In all cases where time will permit,

they should be subjected to a simple and sane preparatory treatment before an operation.

The preparation of patients by the older surgeons was indeed severe, as in those days starvation, vomiting, and free purgation was the routine practice, and in the majority of instances where the patients were robust enough to survive this ordeal, they had little fear but that they would stand the operation. This treatment today we know to be irrational because a patient who has been starved and to whom emetics and purgatives have been administered must of necessity be weakened by the excessive loss of water, and can not possibly be in as good condition for operation as one who has received a less rigorous treatment.

The practice of administering stimulants some days before an operation in anticipation of a weak heart, to patients whose heart action is normal, is only mentioned to be condemned. These should be held in reserve and given only in those cases where conditions arise that demand their use.

The nurse in charge of a patient who is to be operated upon, should give special attention to the diet. As stated above, starving a patient does more harm than good. The patient should partake of a sufficient quantity of nourishing food to keep his strength, but never to the point of overloading his stomach. The diet for some days before the date set for operation should consist of such articles of food as will leave as little residue in the bowels as possible; such as eggs, soups, concentrated broths, toast and coffee (if they are accustomed to it, for breakfast). If the operation is to be performed in the morning, the preceding evening meal should be very light, and only a cup of black coffee or a small cup of strong beef broth should constitute the breakfast. By

the time the hour arrives for operation, it will be found that the patient's stomach will be practically empty. The nurse should insist that the patient drink plenty of water for some time prior to the operation, as it not only flushes the kidneys but supplies the body with sufficient fluid so that the intolerable thirst often noticed after operation is avoided.

The bowels and urine should be given careful attention. A cathartic such as comp. liquorice powder ʒii, or castor oil ʒi in orange juice, or Seidlitz powder, or citrate magnesia should be given the day before the operation to insure thorough evacuation and early on the morning of the operation the rectum should be flushed with either a soap suds enema or normal saline solution, care being taken to see that all is expelled before the patient is brought into the anesthetizing room. In cases where time will not permit of the use of cathartics by the mouth, an enema usually of warm soap suds will answer.

It might be well to state that patients suffering from conditions such as acute abdominal troubles or acute appendicitis with possible abscess, ruptured gall bladder, possible rupture of gastric or duodenal ulcer, a partial or total obstruction of the bowels, any one of these conditions should preclude active purgation, even low enemas when ordered should be given with the greatest care.

The nurse should save a night and morning specimen of urine for examination. She should carefully measure the total quantity passed in twenty-four hours.

The skin should next receive the attention of the nurse. The preparation of a patient should always, when possible, begin with a warm tub bath both with soap and brush. This should be given the day before

the operation, after which a clean night dress is put on and the patient is put back to bed which has been previously changed and aired. The activity of the skin adds much to the elimination after the operation, and relieves the kidneys of much work at a time when it is most needed. If for any reason the condition of the patient is such that she can not be placed in a tub, a sponge bath may be given in the bed. In conjunction with the bath, a douche should be given except in the case of young girls.

The skin is exceedingly hard to get "surgically clean" as the staphylococcus and other germs are present, and it requires considerable effort to dislodge and destroy them. Many methods have been devised, nearly every operator having his own ideas regarding the sterilization of the skin; however, the following will serve as an example. It has been followed at the Good Samaritan Hospital in my work for a number of years and the results are all that could be asked of any skin preparation.

The skin is shaved, if there is any hair, care being taken not to cut the skin; it is then scrubbed with a gauze sponge and tr. green soap; the skin is dried and a moist dressing soaked in 1:10,000 bichloride solution is allowed to stay on overnight. This is removed early on the morning of the operation, when the skin is again scrubbed with tr. green soap and gauze sponge; this is followed by an application of ether to remove any fatty substance, and this by absolute alcohol, after which a sterile dressing is placed over the part and not removed until the patient is on the operating table, when the skin is painted with one-half strength tr. of iodine.

Another method practiced by some surgeons is as follows: The skin is scrubbed with soap and warm wa-

ter and permitted to dry; it is then painted with tr. of iodine after which a sterile dressing is applied and not removed until the patient is anesthetized, after which the skin receives another coat of iodine which soon dries, and the patient is ready for the operation.

That there is no absolutely certain method of skin sterilization is attested by the fact that of the numerous ways that have been devised and advocated by various surgeons, none have stood the test of time, and serious objections may be raised against all; for instance, after the most painstaking method of skin preparation, germs may be found, thus proving conclusively that with any of the accepted methods the skin is not germ free.

The method of applying tr. iodine, which is at present much in vogue, is of questionable value as a germicide, as recent experiments have proved that it probably inhibits the growth of bacteria but does not destroy the spores. It should be remembered, in applying tr. of iodine, that the skin should be perfectly dry, as when applied to a moist skin it does not penetrate to the deeper layers.

A method is suggested by Tinker, of cleansing the skin with soap and water, then applying Harrington's solution and rubbing the skin vigorously for two or three minutes, then sponging off with alcohol.

Harrington's solution is as follows:

Corrosive sublimate,	0.8 gm.
Commercial alcohol (94%),	640.0 c.c.
Hydrochloric acid,	60.0 c.c.
Water,	300.0 c.c.

The preparation of special areas such as those covered with hair, the mouth, vagina and cervix, hands and feet, bladder and rectum, need special attention.

The site of any operation that is covered with hair should be shaved, or the hair removed with depilatories.

On such places as the scalp, eyebrows, pubis and vulva, or in the axilla, if the razor is used, the shaving should be done carefully, the surface should be left smooth and the skin free from small cuts. After the hair has been removed, the surface is cleansed with soap and warm water, which is followed by the application of some antiseptic.

Some surgeons prefer the use of depilatories to remove the hair, as it is easy of application, quick in its action, and possesses some germicidal properties. Morris of New York says, "When the depilatory has been wiped away from the skin after about five minutes' application, the melted hair and superficial loose epithelium comes away, together with any dirt that lies within the area acted upon. The skin is then as sterile, apparently, as it would have been after the labor and prolonged methods of preparation, and we have entirely avoided the disturbance caused by shaving.

"In removing hair from the vulva, for instance, the mucous membranes of the labia are sometimes irritated by the depilatories unless we first brush the mucous membrane with a little sterile oil for protection from plastering the whole vulva with the paste."

Crandon, in his book on *Surgical After-Treatment* recommends Boudet's depilatory which is composed of calcii caustici pulveri (fresh unslaked lime) 10.0; sodii sulphid (crystals) 3.0; and amyli (pulverized starch) 10.0. He says, "These ingredients are separately pulverized, mixed, and kept in a bottle dry. When needed for use, enough water is added to form a thin paste. This is spread on the part to be denuded about ⅛ inch thick by means of a wood or glass spatula. At the end of five minutes, the paste is washed off with sterile water, after which the usual preparation proceeds."

When such parts as the hands or the soles of the feet are to be operated upon, they should receive repeated and prolonged soaking in hot water in which there is plenty of soap, in order to soften the thick, horny skin which can then be scraped off.

If the operation is to be on the mouth, the teeth should be carefully examined, all cavities and rough places

Fig. 72.—Leggings to be worn by patient during operation.

should be attended to by the dentist, a mouth wash should be liberally used, such as phenoglycerite of tannin either full strength or diluted one-half with water, or saturated solution of either boric acid or sodium bicarbonate answers quite as well as a mouth wash.

The preparation of the bladder by the nurse, for operation, consists of the external cleansing, but also of the administration of urinary antiseptics such as urotropin gr. x every four hours with water until from eight to twelve doses have been taken, or salol gr. v, every four hours for several doses; but in some cases irrigation of the bladder with some antiseptic ordered by the surgeon will be required.

The rectum, like the mouth, can not be rendered sterile but much can be done by thoroughly emptying the rectum by enemas of soap suds which are followed by copious use of normal saline or weak antiseptic enemas such as boric acid solution.

The vagina and cervix are both hard to cleanse, and like the rectum they can not be made germ free; however, the free use of hot water and soap in the vagina, together with the removal, if present, of mucus from the cervix, after which the cervical canal is swabbed with 25 per cent tr. iodine solution, will prove beneficial. This is followed by thoroughly douching the vagina with either 1:80 carbolic solution, or 1:5000 bichloride solution.

After the final preparation the nurse should see that the patient has on clean clothing. These consist of leggings which come well upon the thighs, and a plain but clean gown. The hair should be plaited, and the head tied up in a sterile towel or cap made for the purpose. The teeth, if false, should be removed and placed by the nurse in a cup of water. All jewelry must be removed and either given to the family if present, or cared for by the nurse.

CHAPTER XIII

OPERATING ROOM AND NURSE'S DUTIES

The majority of hospitals in this country have the operating room located on the top floor. This is done for three reasons: First, it is out of the way; second, it is less likely to accumulate dust than if located on the first floor; and third, the best light is usually to be had on the top floor.

The old operating room had wood floors, whitewashed ceilings, and no provision was made during its construction for any of the modern conveniences now to be found in a modern operating room. The modern operating room should have a northern exposure, plenty of windows, and a large sloping skylight, the latter being protected on the outside by wire netting. The room should be large, the floor of tile, in the center of which is a drain pipe properly protected. The walls around the room, for a distance of five feet from the floor, are covered with either tile or marble, the remaining side walls, doors, window sash and ceiling should be painted with white enamel paint. The doors usually are so placed that one door leads from operating room to the anesthetizing room, another door leads from operating room to sterilizing room, and the third door leads into the doctors' wash room. The doors are hung so they will open either way, the windows should fit perfectly and be properly screened. The room should be heated by steam and be provided with a hot and cold water spigot direct from the sterilizer, which are operated by the foot. The room should have a large elec-

tric light and gas fixture over the operating table, and also have two or more sockets conveniently placed for portable electric light. Adjacent to the operating room and connected by doors, is the sterilizing room in which all instruments, suture material, dressings, and utensils are sterilized; and the anesthetizing room into which the patient is brought on a carriage. In this room there should be a glass-topped table on which are placed two cans ether, 1 ether drop bottle, 1 bottle chloroform, 1 chloroform drop bottle, 1 tongue forceps, 1 mouth gag, 1 sponge forceps, 1 tube sterile vaseline, 1 jar small sponges, 1 pair scissors, 1 large pus basin, 1 dozen safety pins, ½ dozen soft towels, 1 gown for the anesthetist, 1 hypodermic syringe with tablets of morphine gr. ¼, 1 strychnia sulphate gr. $\frac{1}{30}$, amyl nitrate pearls, 1 pulmotor, and 1 oxygen tank. The doctors' wash room should have lockers for clothing, shower bath, 4 wash basins provided with hot and cold water which are operated by a foot pedal, tr. green soap, brushes, nail files, one bowl each full of slaked lime and soda, one large bowl of 1:5000 bichloride and another bowl of alcohol. The recovery room should contain a comfortable bed, and have windows so arranged that plenty of fresh air can be had without the patient being in a draft.

The things needed in the operating room are, besides a modern operating table, three glass top tables, six large porcelain basins, one glass arm basin, one irrigator, one white enamel stool for the anesthetist, and a chair for the surgeon should he need one, three small porcelain cups, one tray for suture material and needles, one specimen basin, one porcelain bucket, and one Kelly pad.

The three glass top tables should be arranged at convenient distance from the operating table; on one table

should be placed, after it has been covered with a sterile sheet, one sterile laparotomy sheet, two sterile sheets, one dozen sterile towels, two packages sterile sponges one dozen in package, one-half dozen sterile abdominal packs with tapes, each one yard long, abdominal dressings, small sterile cotton compresses, one bowl filled with hot sterile water or normal salt solution for moistening the abdominal packs, one glass tube in

Fig. 73.—Surgeon's scrub room.

which there is wide packing gauze, one glass tube with narrow packing, two cigarette drains, three small porcelain cups (one for iodine, one for alcohol, and one for carbolic acid), three or four small cotton applicators, one clamp to hold the gauze sponge saturated with iodine, and one dozen sterile safety pins.

On the second table may be placed all instruments used in the operation; they should be laid out systematically, all scissors in one place, all forceps placed

Fig. 74.—Rubber drains, small sponge, large abdominal pack on forceps—sponge held in sponge forceps.

Fig. 75.—Correct position of first assistant nurse—scrub nurse—also arrangement of table with instruments and dressing.

together, and so on. The suture material and needles are placed in a small tray.

On the third table are to be found one flask of alcohol, one flask of tr. green soap, one flask tr. iodine, one flask tr. iodine one-half strength, one flask of carbolic acid, and a flask containing one quart of sterile normal salt solution.

The six large porcelain basins should be used as

Fig. 76.—Patient in position for operation on perineum or rectum.

follows: Two basins, one filled with 1:5000 bichloride solution and one filled with sterile water, are for the surgeon's use; two basins with same solutions are for the assistants; and two for the nurses' use. The gloves of the surgeon and assistants and nurses should be placed in their respective basins.

The irrigator should have two bowls which are filled with quite warm sterile water and 1:10,000 bichloride

solution. It should be seen beforehand that the irrigator is in good shape.

Before the patient is brought into the operating room, the operating table should be padded with a piece of felt cut the shape of the table, over which is placed a rubber sheet, and over this is spread a sterile cotton sheet. The padding of the table protects the bony prominences from pressure directly against the metal top.

Fig. 77.—Proper way to hand needle holder to surgeon.

After the patient has been anesthetized and placed on the table, the nurse should remove all clothing down to the sterile dressing which covers the site of the operation, the chest should be covered with a small blanket, the lower limbs should be completely covered with a blanket over which is placed sterile sheets. The sterile dressing is now removed and the skin is given another coat of tr. iodine. This is allowed to dry, after which

the laparotomy sheet is spread over the entire body. In every operation, no more of the body should be exposed than is essential for two reasons: first, undue exposure is unnecessary and inelegant, and second, the body heat should be so conserved as to lose as little as is absolutely necessary. If the upper extremities are not to be operated upon, they should be laid straight out alongside the body, or they may be folded upon the chest, care being taken that they do not rest on the edge of the table for fear of musculospiral paralysis.

In the performance of the average operation, the surgeon has three assistants: one who stands opposite him and lends first assistance; the duties of the second assistant are to render any help that may be needed by the surgeon and first assistant, and to take the first assistant's place in his absence; the third assistant administers the anesthetic, and his duties rank next in importance to that of the surgeon.

Three nurses should be on duty in the operating room during a major operation. The head nurse or surgical supervisor, the first assistant nurse, and second assistant nurse. The duties of each are as follows:

The head nurse is in full charge of the operating room and is responsible for the cleanliness, preparation of the room, sterilization of all articles used during an operation, and the conduct and technic of all nurses under her supervision. She instructs the nurses in the preparation of various solutions to be used, such as normal salt solution, carbolic acid solution, bichloride solution, and in the making of all dressings, sponges, and bandages.

The first assistant nurse's duties are to prepare the operating room for all operations, lay out the necessary basins, pitchers, solutions, and dressings; to see that the room is at the proper temperature, and to sterilize her

Fig. 78.—Making gauze sponge—gauze folded lengthwise.

Fig. 79.—Making gauze sponge—ends folded so as to meet in middle.

hands and put on sterile gown and gloves and assist at the operation. She is also expected to cleanse the room after each operation, and if the case operated upon has pus, she should seal and thoroughly disinfect the room.

Fig. 80.—Gauze sponge completed.

Fig. 81.—Proper way to hold glove for surgeon.

This should be done once every two weeks when there have been only clean cases. She should understand how

Fig. 82.—Proper way to thread needle.

to operate the sterilizers for both water and dressings and keep them clean and brightly polished.

The duties of the second assistant nurse are to assist

the first assistant nurse in preparing the room for operation, keeping things clean in the interval between

Fig. 83.—Proper way to hand knife to surgeon.

operations, assist in making and sterilizing the dressings. She is expected to render any help the anesthetist

may need. She removes the instruments in the wire basket from the sterilizer without touching them, and brings them into the operating room to the first assistant nurse, who arranges them on a sterile table.

The duties of each nurse should be thoroughly understood that when the operation is once begun it should be carried to completion without the slightest hitch on the nurse's part. No one thing adds so much to the value of a nurse as the power of concentration and observation. She should have her mind at all times on her duties and should be able to anticipate the wants of the the surgeon without his having to ask each time for this or that thing. She should have things so arranged that she can put her hand on any article wanted without having to look for it.

All of these points should be observed if the nurse would become proficient, as it means the saving of much time while the patient is under the anesthetic.

CHAPTER XIV

OPERATIONS IN PRIVATE HOMES, AND HOW TO PREPARE THE ROOM

Operations in private homes are always surrounded with many difficulties, while the surgeon in charge and the nurse on duty suffer many inconveniences. The possibility of rendering a room in a private residence as sterile as the operating room in a well regulated hospital is well nigh impossible. However, many serious operations are performed in private homes, and brilliant results are often obtained.

It is always difficult to prepare a room for operation in a private home, and this is much harder to do in some homes than in others owing to the circumstances of the people, surroundings and environments, as the average home of the well-to-do class of people is usually clean, while among the poorer classes the surroundings are sometimes very undesirable and their ability to purchase certain things needed is necessarily limited.

When an operation is to be performed in a private home, the nurse should be sent to the home the day before the operation is to take place, and should have instructions if possible as to the choice of the room and its preparation. If she is not so instructed, she will have to rely on her own judgment as to details. She must select a well lighted room and in close proximity to the one the patient is to occupy. All furniture should be removed, as well as all pictures, curtains, and the carpet. The walls, windows, and doors should be wiped down with a cloth wet with 1:1000 bichloride solution, and the floor should be scrubbed. This should all be done

the day previous to the operation, and under no circumstances should the dust be raised by sweeping. The nurse should give her attention to the preparation of the table, solutions, and dressings. The table may be a portable operating table sent to the house by the surgeon, or a kitchen table properly cleaned and padded may answer every purpose. She should have plenty of boiled water, both hot and cold, in sterilized pitchers, three sterile sheets, one blanket, and one dozen sterile towels besides the sterile dressings, two small tables covered with sterile cloths, one for instruments and the other for dressings and solutions. The instruments can be sterilized by boiling on the kitchen stove, and basins for the surgeons to use in washing, together with one filled with bichloride solution 1:5000 and another with warm sterile water into which the sterile gloves may be placed. A good hypodermic syringe with the necessary heart and respiratory stimulant, together with an oxygen tank should be at hand and ready for use should the occasion arise. A Kelly pad, sterile fountain syringe and a large foot tub are also articles which the nurse should not overlook. The nurse should see the patient has been bathed and properly dressed for the operation, as well as that the skin has been properly prepared. Before the patient is taken from the operating room, her room should be well aired and the bed changed and hot-water bottles so placed as not to come in contact with the patient's skin. If the patient is to occupy the same room as that in which the operation has been performed, the preparation should be carried out in a quiet, orderly manner, so as not to get the patient nervous; and immediately after the completion of the operation and before the patient recovers consciousness, all tables, chairs, soiled sheets, towels, sponges and instruments should be removed and the room put in order.

CHAPTER XV

POSTOPERATIVE CARE OF PATIENTS

The postoperative care of patients by the nurse begins when the operation has been completed and the patient removed to her room and placed in bed. Much depends at this time upon the nurse, as she is left after the operation with the patient; and nothing so adds to the reputation of the nurse both in the estimation of the patient and that of the surgeon, as careful and painstaking after care. The patient's welfare and comfort should be her first thought; her duties should be executed with care and forethought, and her every act while on duty should be performed in such a manner as to not excite the patient's suspicion, but on the contrary should inspire the greatest confidence in her. Once the nurse gets the confidence of a patient, the nursing becomes much easier.

Before the patient has been brought to her room, the nurse will have prepared the same for the patient's reception by having it at the proper temperature, usally about 72° F., with light somewhat subdued, and ventilation amply provided for. The bed should be well aired, and clean sheets, pillow slips, and blankets should be had. The bed should be made up and covers turned down, hot-water bottles should be placed in the bed to get it warm. However, after the patient has been placed in bed, these should be placed at a convenient distance and separated from the patient by a blanket to keep from burning. After the patient shows signs of reaction, that is, warm skin, perspiration, better pulse, and pa-

Fig. 84.—Bed properly prepared to receive patient after operation.

Fig. 85.—Rubber hot water bottle.

tient becoming noisy and throwing herself around in bed, the hot water bottles may be removed and possibly one of the blankets. These should not be removed too

rapidly, as the patient might get chilled and bad results follow.

The patient should not be left alone for an instant until she has fully regained consciousness, as patients in recovering from the narcosis of an anesthetic often throw themselves around in the bed and not infrequently get their hands under the dressing and either tear off the dressing or infect the wound. It is always well to place the hands outside the sheet but under the blanket.

In most hospitals, the orders given the nurse by the surgeon are written in a book kept for the purpose, which is called an "Order Book;" all orders should be written, as the nurse is likely to forget something. It is good practice in nursing in private homes for the nurse to either have a book in which all orders are written or she should take them down herself as given by the surgeon. It is my custom to write all orders; for an average case where there is reason to feel that no complications will arise, the following orders usually suffice:

First.—When the patient begins to come out and get noisy, administer morphine sulphate gr. ¼, and if the patient continues to suffer in three hours the nurse may give either codeine phosphate gr. ½ or heroin gr. $\frac{1}{12}$. This will usually be found sufficient to control the majority of cases. It should be stated that it is best to give as little opiate as possible, since it has a tendency to constipate the patient and prevent the expulsion of gas.

Second.—Water as soon as possible and in small quantities and frequently repeated, or cracked ice may be given in place of water. Should nausea or vomiting persist, the patient should be given one or two glasses full of water in which has been placed gr. 30 of bicar-

bonate of soda in each glass. Should the patient vomit or retain this, withhold all liquids for three or four hours, when small quantities of water can be tried.

Third.—Pass the tube for gas, if necessary.

Fourth.—Catheterize, if the patient can not void in eight or ten hours from the time she last passed urine.

Fifth.—Should the pulse become weak, give strychnia sulphate gr. $\frac{1}{30}$ or 15 ♏ of tincture of digitalis and report patient's condition to the surgeon at once.

The nausea after an operation is quite annoying to some patients; however, this usually subsides during the first twenty-four hours. It may persist for a longer period, and in some cases is only relieved after the stomach has been thoroughly emptied. The nurse should see that the patient lies flat on the back and keeps absolutely quiet. The vomiting is some cases, after an anesthetic has been taken, is not severe and ceases after the stomach has been emptied. This may persist for two or three days in severe cases and not only weakens the patient, but causes intense pain after abdominal operation. For the relief of this distressing symptom, the nurse should frequently sponge the face and hands in cold water, rinse the mouth with cold water, or the following may be given:

Oxalate cereum,	gr. v
Bismuth subnitrate,	gr. x
Muriate cocaine,	gr. ¼

Give the above in one powder, or cracked ice. This may be repeated in two or three hours if not relieved. Probably of all remedies for postoperative vomiting, none is quite so effective as washing out the stomach. This may be accomplished in two ways: First, the stomach tube may be swallowed and the stomach washed

thoroughly with a quantity of either warm water or warm normal saline; second, the patient may be instructed to drink several glasses of warm water into which have been placed thirty to forty grains of sodium bicarbonate; after the stomach has been filled in this

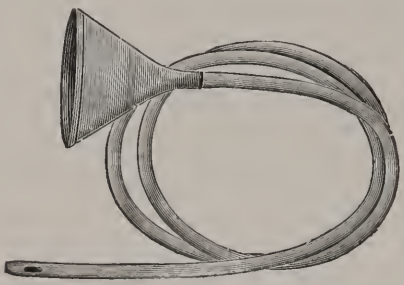


Fig. 86.—Stomach tube.

manner, it will be quite easy to vomit the entire contents. Much has been written of late years about acetone, and it has been found that in many of these cases of persistent vomiting acetone is present in the urine,

Fig. 87.—Pus basin.

and the administration of bicarbonate of soda in dram doses by the rectum will cause the vomiting to ease. It might be stated that in some cases, after the employment of all recognized remedies, the vomiting continues and finally ceases of its own accord; these are

supposed by some surgeons to be of a nervous origin.

Some patients suffer more pain after operation than others, usually nervous patients suffering most. This condition is best controlled for the first 36 hours with morphine, codeine or heroin in proper doses and at proper intervals, depending upon the severity of the pain. The administration of opiates causes constipation, and sometimes nausea, and in some cases the retention of urine follows its use. The use of such drugs should be made with the greatest possible caution, as patients are quick to learn their virtue in relieving pain and may become addicted to their use. The nurse should, under no circumstances, tell a patient what she is giving. Some patients do not suffer so much from pain in or near the incision as they do with their back. This is due in all probability to the fact that the muscles supporting the spine are relaxed by the anesthetic, and the shape of the average operating table is such as to allow sagging of the back. This may be overcome by placing a small sand bag or pillow under the small of the back.

The catheterization of patients after operation is one of the duties the nurse is frequently called upon to perform. She should be scrupulously clean in order that infection of the bladder may not follow, an error which always reflects great discredit on a nurse. Some patients can not pass their urine for some days after being operated upon. Whether this is due to nervousness or to the position in bed is hard to say; nevertheless it is true that operations in and around the bladder, such as rectal and pelvic operations, may cause retention. The nurse should try warm applications if possible over the bladder, and place the patient on her side or turn a faucet or pour water from one pitcher to another; the patient hearing the sound of the water may thus void

urine. Should the simple expedients fail to accomplish the desired result, she should resort to the use of the catheter. As to how often the catheter should be used depends upon several conditions; as, in a case in which there has been considerable loss of blood, excessive purgation before the operation, or where there is profuse perspiration and the quantity of water taken by the patient is small, the interval between catheterizations is much longer than where the loss of water from the system is small and the intake of water is large. It may be stated that in a majority of cases the catheterization of a patient every eight or ten hours will usually be found sufficient, and under no circumstances should the catheter be used after the patient is able to void urine except to obtain a specimen of urine direct from the bladder for the purpose of examination.

The nurse should learn early in her nursing career the difference between retention of urine and suppression of urine. In the former, the kidneys are secreting the urine, which passes into the bladder, but the patient can not pass it out; in the latter, the kidneys do not secrete any urine, therefore when the catheter is passed into the bladder it fails to bring any urine—a very grave condition and one that should be reported to the surgeon at once.

Some patients suffer considerably from the accumulation of gas in the stomach and intestines; the severity of the pain caused by gas sometimes far outweighs that caused by the operation. The accumulation of gas in the stomach is relieved usually by vomiting, but more promptly by inserting a stomach tube and washing out the stomach. When the gas is in the bowel, a dose of castor oil if the patient can stand it, or enemas which contain glycerine, salts, and turpentine may relieve the

patient, or the passage of a rectal tube may bring prompt relief.

After an operation, the bowels should move on the third day; and if the patient is uncomfortable, a laxative enema may be used on the second day; however, the patient's bowels should be moved by a cathartic on the morning of the third day, and one passage daily should be had thereafter.

The nurse should carefully record the temperature, pulse, and respiration every four hours except when the patient is asleep, the convenient hours being at 8 A.M.,

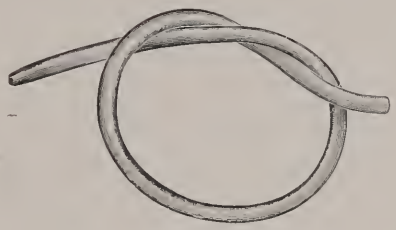


Fig. 88.—Rubber rectal tube.

noon, 4 P.M., and 8 P.M. The nurse should see that the patient has had no cold or hot water in the mouth for some time before taking the temperature, and she should count the pulse while the patient is quiet and not after the patient's bath or after the bed has been changed, as these disturb the patient to a certain extent and may cause an increase in the beat for a short while.

The drinking of water and the diet after operation will depend upon the condition of the patient and the character of the operation; as in stomach and intestinal surgery, the diet is either liquids or nothing at all is given for 36 to 48 hours. In the average case, the liberal use of water is not only beneficial to the patient, but

Fig. 89.—Bed arranged for tub bath.

Fig. 90.—Bed arranged for continuous (water either poured or sprayed) bath.

Fig. 91.—Method of changing draw sheet on bed without exposing patient.

Fig. 92.—Tastily served diet tray.

exceedingly grateful. Liquids are usually given for the first three or four days, or until the bowels have been moved well, then soft solids such as eggs, milk-toast,

soups, etc., may be given for a short while, when the patient is gradually placed back on regular diet.

The morning bath, when patients are not too sick to take it, is very refreshing and helpful. The nurse should give the patient a warm bath daily, care being taken not to expose the patient unduly and to be sure that all soap has been removed from the skin. The bathing should be followed by a light massage of the limbs, both upper and lower, and the back with the liberal use of alcohol.

After the patient has been bathed, a change of clothing should be at hand and placed on the patient, after which the bed linen should all be changed, when the patient's toilet is complete for the day.

The nurse should also see that the mouth and teeth are kept clean with cotton swabs and some antiseptic mouth wash; later, when the patient is able she should be given her toothbrush.

When should a patient sit up? Some surgeons believe in getting them up on the second or third day. This, I think, is rushing things too much. Some keep them in bed for three weeks; this, in the average case where union is had by first intention, is too long. The average case will be in bed for ten days, then permitted to sit up for a short while each day, and go home on the fourteenth day. The time when they should sit up depends on each individual case.

CHAPTER XVI

NURSING IN SPECIAL CASES

While there is a certain general routine in nursing the average surgical case, there are a number of patients who require certain operations that demand an extra amount of attention by the nurse.

In lacerated perineum which is caused by childbirth, the operation known as perineorrhaphy is performed. The perineum may be torn down to but not through the sphincter; this is called an incomplete tear; or, it may extend through the sphincter into the bowel, and is called a complete tear. In all operations upon the perineum, it is of the utmost importance to keep the parts clean, and to this end the nurse should frequently inspect the site of the operation, and if necessary bathe the parts and place fresh dressings over them. On the fourth or the fifth day, the bowels should be moved by a laxative; this may be preceded by an enema of a few ounces of olive oil in order to soften the fecal matter in the rectum. This is especially desirable in those cases where the tear has extended into the bowel, as the stitches may be put on a tension or tear out as the result of large, hard fecal masses passing over them, if the matter has not been previously softened. After each bowel movement and after each urination, the parts should be cleansed by placing the patient on a bed pan and pouring a pitcher of warm antiseptic solution over them. Some surgeons require the nurse to catheterize the patient for the first two or three days to prevent the urine from infecting the wound. In all operations upon

the vagina, the same rules should be observed as stated above. In operations upon the rectum, the same diligence should be exercised by the nurse in keeping the parts clean. Frequent sponging and change of pads will insure sufficient cleanliness for prompt healing of the wound.

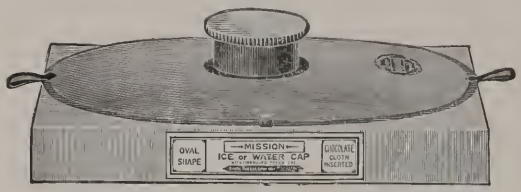


Fig. 93.—Ice cap.

In cases of empyema, that is, pus in the pleural cavity, the operation is one where either a portion of one or more ribs is removed, pus evacuated, and tubes for

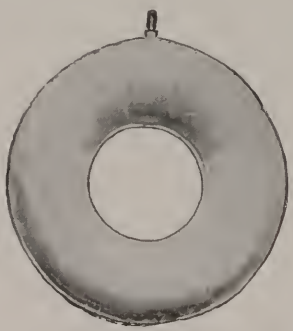


Fig. 94.—Rubber air cushion.

drainage are inserted. In a case of this kind, the nurse should be extremely cautious in removing the dressings, not to remove the tubes and to see that they are securely fastened to prevent the escape into the pleural cavity, as has frequently happened. It may be that the flow of

pus will be so great as to require numerous dressings, and some of these will naturally fall on the nurse in the absence of the surgeon or his assistants, and she will do well to remember that the displacement of the tubes will cause considerable inconvenience to the patient and anxiety to the surgeon.

In cases of fracture which the nurse is called upon to attend, her principal duties will be to make the patient

Fig 95.—Dressing wound. Soiled dressings removed—wound cleansed. (Note paper bag folded to receive soiled dressings.)

comfortable, prevent bed sores by keeping the sheets and clothing smooth, sponging the back, and by the use of air cushions. When the bowels move, the bed pan should be used, placing it under the patient in such a manner as not to disturb the fracture; in fact, all handling of the patient, such as bathing, changing of clothes and bedding, should be done in a gentle and careful manner.

In cases where drainage of the gall bladder is necessary, the nurse should see that the receptacle for catching the bile is emptied; the skin should be kept clean, and all bile stained dressings, clothes, and bedding should be changed.

In an operation such as colotomy, where there is

Fig. 96.—Dressing wound. Sterile dressings over wound held in place with adhesive straps.

likely to be much soiling of the skin by fecal discharges, the nurse should frequently change the dressings, bathe the skin, and apply zinc ointment should the skin become irritated. All dressings should be changed frequently, not only for the sake of cleanliness, but to keep the odor down as much as possible.

In vaginal hysterotomy, some surgeons prefer to clamp all vessels and leave the clamps protruding from the vagina. In such cases, the nurse should exercise the greatest caution lest the clamps become detached,

or undue tension be placed on them in changing the patient's position.

In all cases where there is pus, the nurse should have a paper bag ready at each dressing to receive all soiled dressings, sponges, etc., and the whole contents should be burned. All instruments used in dressing should be boiled before and after their use. The nurse should wear rubber gloves and these should be boiled after

Fig. 97.—Dressing wound. Dressing completed.

each dressing and placed in a porcelain pan in which there is 1:5,000 bichloride solution.

When for any reason the surgeon leaves a catheter in the urinary bladder the duty of removing, cleansing and replacing same will most likely fall on the nurse. She should observe the rules of surgical cleanliness regarding her hands, the catheter may be cleansed by boiling, or a new catheter may be used which of course should be thoroughly sterilized before its introduction.

CHAPTER XVII

POSTOPERATIVE COMPLICATIONS

After any surgical operation, certain complications may arise; and while the duty of the attending nurse is not to treat them, she should be on the alert and notify the surgeon when there is the slightest deviation from the normal course. Some complications such as hemorrhage, shock, and respiratory failure come on so quickly that she may have to act promptly in the absence of the surgeon. The nurse should use judgment in all such cases, and be equal to any emergency that may arise, never for a moment permitting herself to become excited, as much depends upon her calmness, which not only allays all fear that the patient may have but prevents the family or friends from becoming excited.

Hemorrhage is one of the most dangerous complications that can arise following an operation. The bleeding may be an ooze from the capillaries. This form of hemorrhage is easily controlled by pressure, elevation of the part, the application of adrenalin solution 1:1000, Monsel's solution of iron, tannic acid, sodium chloride (common salt), pulverized alum, very hot applications, or ice. Any one of these may be sufficient to stop moderate capillary bleeding.

In cases where the hemorrhage is venous, that is, where the blood flows from a vein, there is a steady flow of dark red blood. Pressure will usually control venous bleeding. Should the bleeding come from a large artery, a fatal termination may speedily ensue if it is not promptly checked. If the hemorrhage is from an artery

in a limb, the nurse should place a rubber bandage or an extemporized tourniquet until the surgeon can arrive. In other parts of the body where a tourniquet can not be used, firm and direct pressure may check the flow of blood until other measures can be used, such as grasping the artery with a pair of hemostatic forceps and tying the vessel or a deep suture placed by means of a curved needle will often be all that is required.

In postpartum hemorrhage the nurse should cleanse her hands, put on a pair of sterile gloves, and insert one hand if possible and remove all clots in the uterus, then give the very hot (120°) douche of sterile water. A sponge saturated with vinegar and placed in the uterus will often check the bleeding. A hypodermic of ergotole 20 minims, or pituitary extract given hypodermically will cause prompt contractions.

In cases where bleeding is internal, there is little the nurse can do except to sustain the patient until the surgeon can be summoned.

In severe hemorrhage, the foot of the bed should be elevated and a pint or quart of normal salt solution should either be injected under the skin or given intravenously. It is well for the nurse to remember that when the bleeding is internal, the use of powerful stimulants will cause an increase in blood pressure and continue the bleeding. In these cases a dose of morphine gr. ¼ is frequently given with good results. The nurse should not lose sight of the fact that some patients are "bleeders;" that is, their blood will not clot, in which case the use of lactate of calcium in 10 to 20 grain doses, or horse serum, may be of great service.

The symptoms of hemorrhage are fairly constant, depending upon the amount of blood lost. There is also a certain amount of shock in every case where much

blood is lost, due to the heart pumping against a lessened peripheral resistance.

In severe hemorrhage, there is restlessness, increase in pulse rate, the patient will call for water and demands air, breathing becomes rapid and labored, pallor of face, pupils dilated, extremities become cold, surface of body and face bathed in perspiration, and if the hemorrhage continues the symptoms become more pronounced, the pulse is thready and irregular, respiration becoming weaker all the time until death ends the scene.

Respiratory failure is most often met with during the performance of an operation, and is less frequently met with postoperative, than other complications. The symptoms are shallow breathing, cyanosis, and finally complete failure to breathe. When this occurs during an operation, the anesthetic is promptly removed, artificial respiration, oxygen, inversion of the patient, rhythmical traction on the tongue, and hypodermics of atropine and strychnia may be given.

Shock may be immediate—that is, while the operation is in progress—or it may be delayed and come on either a few hours or days following the surgical procedure. When shock comes on gradually, there is noticed an increased pulse rate and a decrease in the volume and tension. The respiration becomes faster and the lips and face pallid, temperature drops if the condition of shock persists, all symptoms become more pronounced toward the end. Many patients become maniacal and throw themselves around until they are completely exhausted and die.

The causes of shock are many; however, it may be stated that prolonged operations, too much anesthetic, rough and undue handling of the viscera, together with improper preparation of the patient for operation may

all be contributing factors and in many instances actually cause profound shock.

Fig. 98.—Method of giving hypodermoclysis.

The treatment of shock may best be by such measures as will prevent its occurrence, such as through emptying

of the bowels but not excessive purgation, the administration of atropine gr. 1/150 with morphine gr. ¼ before the operation. The operation should be performed quickly and in such a manner as will not produce any undue trauma to the parts and the minimum loss of blood. The patient should be wrapped in warm blankets following the operation, to prevent the loss of body heat.

When the patient is in shock, the administration of adrenalin 5 to 15 minims of a 1:1000 solution should be given either hypodermically or intravenously in salt solution. Digitalis hyperdomically, or sodium benzoate of caffeine in 5 grain doses may be employed with good effect. A good stimulating enema may be given, such as:

Black coffee,	ʒ 6
Brandy	ʒ 1
Digitalis	♏ 20
Laudanum	♏ 15

Perhaps the most effective remedy is the injection of a quart of normal salt solution under the skin, or intravenously.

The use of any of the above mentioned remedies should be employed only by directions given by the surgeon.

Pneumonia, suppression of urine, tetanus, sepsis, peritonitis, and erysipelas are such postoperative complications as will be detected and treated by the surgeon. In all these, the nurse should record his orders carefully and she will not be spending her time in vain if in her leisure moments she reads from some standard textbook their cause, symptoms, and treatment.

CHAPTER XVIII

ANESTHETICS AND ANESTHESIA

The subject of anesthesia is one that is full of interest to the nurse as well as to the physician. The nurse may never be called upon to administer an anesthetic; nevertheless, a knowledge of the different kinds of anesthetics and the different methods of administration will do no harm.

Not infrequently a nurse is called upon to give an anesthetic in the absence of sufficient surgical help, and her duties and responsibilities on such an occasion may be equal to, if not greater than those of the surgeon. Formerly, nurses were only called upon in emergencies to give anesthetics; but now in some of the largest hospitals we see the nurse in the role of regular anesthetist to the institution.

To become expert, she should receive special training, though she can acquire a reasonable degree of skill by watching its administration by the doctors while in the discharge of her duties in the operation room.

Before considering its administration, it is interesting to note that no branch of medicine or surgery has more history attached than that of anesthesia. It has been said that the first anesthesia ever produced was that by the Divine Providence when He caused Adam to steep and from his side removed a rib. Be this as it may, we know that from almost the dawn of man, anesthesia in some form or other has been practiced.

The ancient Assyrians employed the method of digital compression of arteries to produce numbness. An-

cient Egyptians used Indian hemp to become drowsy. Passages in the Talmud refer to easing pain of torture and death by giving draughts of spiced wine to the victim.

The Greeks were well versed for their time in the use of anesthetics, as at the siege of Troy the Greek surgeons used astringent and anodyne poultices to relieve pain.

They were the first to use mandragora, around which much superstition centered; as, for instance, in the gathering of this drug they would go at the dead of night with a dog that was tied to a leash, so when he struggled to loose himself he would scratch up the roots of the mandragora which let out shrieks that killed the dog. If these phenomena did not take place and the dog was not killed, the plant was of no value as it had lost its strength.

The roots and bark were boiled in wine, and a small glass full was given to produce sleep and relieve pain. The Greeks used another plant called "morion" for anesthetic purposes. This is supposed to be closely allied to mandragora. The Romans practiced surgical anesthesia with much the same drugs as did the Greeks.

The Hindu surgeons not only produced complete anesthesia, but went one step further than their predecessors in that, after the operation was completed, they gave another drug called "sanjivini" to quickly restore consciousness.

The Chinese in 220 A.D. used probably Indian hemp, and some native surgeons in the rural districts of China to this day have never used any of the modern anesthetics, but rely upon some drug or combination of drugs which has been handed down for generations, to produce anesthesia.

Later on in the middle ages, we are told that the Irish surgeons used the volatile principles of drugs to produce sleep. Thus we see up to this time numbness and sleep were produced either by drinking a decoction of the sleep-producing drug or it was applied externally in the form of a poultice.

It remained for Priestly, in 1767, to discover what he termed "vital air" or oxygen, which gave impetus to others who were trying to discover an ideal anesthetic. In 1776, he made a further discovery: nitrous oxide, which was first used for anesthetic purposes in 1799. Horace Wells was the first to use it in this country. Ether was used first in Boston as an anesthetic in October, 1846, and has since held first place among the long list of anesthetics. Chloroform was first used in Edinburgh by Simpson in November, 1847, and has since been used extensively.

From the foregoing, it can be seen that anesthesia has a long history; and while the Ancients employed anesthetics in a crude way, they must have afforded relief to some degree. Operations performed before the days of ether and chloroform meant agonizing pain, and those with stout hearts often quailed at the thought of having to undergo the terrible ordeal. Thus it is said of Lord Nelson that he was so painfully affected by the coldness of the operator's knife when his right arm was amputated at Teneriffe, that at the Battle of the Nile he gave orders to his surgeons to have hot water kept ready so that at the worst he might be operated upon with a warm knife.

Anesthetics are now spoken of as either general or local. Of the general anesthetics, ether, chloroform, and nitrous oxide gas are the ones usually employed. Ether and chloroform are used for prolonged operations, while

nitrous oxide is useful for short operations. General anesthetics are used to relieve pain during operations, childbirth, to produce muscular relaxation so as to reduce hernias, dislocations and fractures, to make diagnosis, and in convulsions. Patients that are to undergo surgical operation should receive some preparation when possible. The nurse should see that the bowels have been thoroughly emptied by either enemas or catharties, depending upon which the surgeon orders. The amount of urine passed during the twenty-four hours preceding the operation should be carefully measured and recorded. A specimen should be examined, and the results written on the chart. The pulse and respiration should be counted some hours before the operation when the patient is quiet. The diet should be light and nutritious, preferably broths and gruels, and the patient should be encouraged to partake freely of water, as this supplies the system with plenty of fluid, flushes the kidneys, and allays to some extent the unquenchable thirst following operations. The day of the operation, the patient may be given, three or four hours prior to the operation, a cup of coffee or broth. The nurse should consult the surgeon regarding the amount and character of food and drink given the patients. All loose teeth should be removed. The administration of anesthetics to patients who only a short time before have taken food is almost certain to produce vomiting. This is as annoying to the surgeon as it is unnecessary, as it sometimes delays the operation and there is danger of drawing particles of food into the larynx or bronchi, thereby producing disagreeable symptoms. After the anesthetic has been started and the patient begins to vomit, it is best to turn the head to one side and hold the jaw up slightly and let the stomach be well emptied, when the anesthetic may be pushed. Later during the operation, should there

Fig 99.—Anesthetic room.

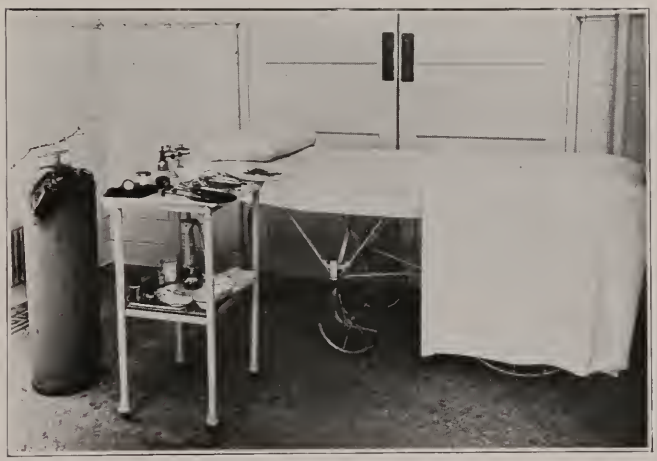


Fig. 100.—Anesthetic room with carriage, table, and oxygen tank.

be a tendency to vomit, it will only be necessary to give a little more of the drug to check the vomiting.

The nurse should have ready, in each case where a general anesthetic is to be given, the following: two

Fig. 101.—Anesthetist table.

small porcelain basins, half dozen towels, tube of sterile vaseline to grease the patient's face and lips, as ether

and chloroform are often quite irritating to the skin; two ether cones made of paper and towel or an Allis

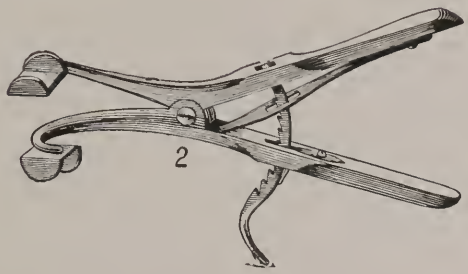


Fig. 102.—Mouth gag.

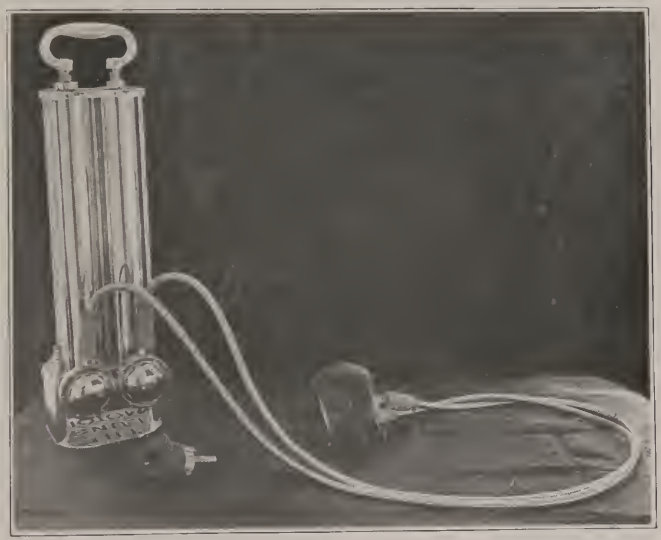


Fig. 103.—Lungmotor. (Note mouthpieces—one for child and one for adult.)

ether inhaler, the former being better as they are quickly made and a fresh cone can be had for each case; a good hypodermic syringe, strychnia, digalen, atropine, mor-

phia, benzoate caffeine, oxygen tank, pulmotor, tongue forceps, and mouth gag.

Patients vary very much in their behavior when taking anesthetic, as some go under its influence quietly while others are boisterous and require holding. It is well after the patient is on the table or ward carriage to strap the limbs and arms before the anesthetic is started, as they are held more securely and much commotion is often avoided.

When ether is given, all unnecessary noise and talking should be avoided, the cone should be held a little distance from the face, for a few moments, as this often allays the fear patients frequently have that they will suffocate. After the irritation from the first few whiffs has passed, the cone may be placed over the nose and mouth, at the same time, encouraging the patient to take deep breaths. The patient may struggle and cry out, the face is flushed and the respiration and pulse quickened. The ether is given all the while, when the patient finally quiets down and becomes relaxed. At this stage, the patient may come out quickly if the ether is withheld for any length of time. As the anesthetic is continued, the muscular system is relaxed, the patient is insensible to pain, and the reflexes are abolished except the pupil reacts to light. During the administration of ether, care should be taken that no light or fire, such as cautery, comes too near to the vapor, as ether is highly inflammable.

Patients sometimes cease to breathe when taking ether. This may be only for a moment, as when fresh ether is added to the cone. When, however, this occurs and the face becomes cyanotic, the cone should be removed at once, the jaw held well forward while pressure is made by an assistant on the sides of the chest. If these are of no avail and the state of anesthesia seems to be deep-

ening, the resort to artificial breathing, stimulants, lowering the head of the table, oxygen and pulmotor may suffice to restore the patient. Should there be a tendency for the tongue to fall backward and interfere with breathing, it must be held forward with forceps or a ligature on needle placed through the tongue. This latter, while resorted to sometimes, is undesirable, as the tongue is left very sore afterwards.

The use of chloroform as an anesthetic is preferred by some surgeons, though on the whole ether is more frequently used as it is considered less dangerous; though chloroform, when given by an experienced anesthetist, has many qualities to recommend it, as it is less irritating, patients get under its effect quicker, and the period of recovery is much shorter than when ether is given.

The nurse should not attempt the administration of chloroform unless she has previously had some experience with it, as its action on the heart is sometimes sudden, producing fatal syncope before stimulants can be given. Ether is not so rapid in its effect and spends its force on the respiratory centers. Chloroform is extensively used in obstetrics, young children and old people, and is to be preferred to ether when there is any kidney lesion present.

The preparation by the nurse of patients who are to take chloroform is the same as that when taking ether.

The nurse may seldom be called to administer a local anesthetic, as this is usually done by the surgeon or one of his assistants.

There are many local anesthetics; however, those which the nurse will see most commonly used are cocaine, novocaine, ethyl chloride, ice and salt.

Cocaine has been used as a local anesthetic since 1884, and while possessing some toxic properties, its effect is most complete when properly used. It can be applied

on pledgets of cotton to open wounds and to the mucous membranes, and for the latter reason it is used extensively in nose and throat operations. When an operation such as opening a felon or abscess is to be performed, it is injected with an ordinary sterile hypodermic or a syringe made especially for the purpose. It is used in from one-half per cent to ten per cent strength, four per cent being most commonly used. The layers of the tissue to be incised are infiltrated by inserting the needle slantingly into the skin and depositing the solution in drops in a line through which the incision is to be made.

Novocaine is used extensively and is less toxic than cocaine, hence it is much more desirable as a local anesthetic. Ethyl chloride is a convenient local anesthetic and is free from the possible toxic effect, as it is sprayed on the area to be operated until the tissues are blanched, when incision may be made without pain. Ice and salt, when mixed and applied to the surface, renders it numb and slight operations may be performed while the anesthetic effect lasts, which, however, is of short duration.

CHAPTER XIX

INJURIES IN WHICH A NURSE MAY BE CALLED TO RENDER FIRST AID

During the course of every professional nurse's career she may be called upon to render first aid to persons who are injured. While a nurse is not expected to either practice medicine or surgery, or assume the responsibilities of treatment which naturally fall upon the surgeon, she may be and frequently is called upon to render the first services until a surgeon can be called to take charge of a case; hence, a knowledge of the common injuries and how to treat them may be helpful to her.

Sprains are quite common injuries which are produced by violent twisting or straining of the soft parts surrounding the joints. Sprains may be slight, moderate, or severe, depending upon the violence of the accident. Sprains may be so severe as to detach a small portion of the bone, in which case they are spoken of as sprain-fractures.

When a sprain occurs, the affected portion should be at once put at rest, the limb should be elevated and either very cold cloths or hot applications, whichever is most acceptable to the patient, should be applied continuously, or a tight fitting bandage should be applied should it be impossible to use the hot or cold cloths.

Fractures are injuries that are frequently met with, and this class of injuries should receive as prompt attention as possible because the longer the interval between the receipt of the injury and the treatment, the more difficult will the management become.

When a person sustains a fracture, he should lie down; and should much deformity result, the nurse should take the limb and gently pull it into a straight position if possible, and place it on either a pillow or a padded board and then apply cold cloths until the surgeon arrives. Should the fracture be compound, that is, where either the bones protrude through the skin or where there is an open wound leading to the site of the break, the wound should be cleaned as thoroughly as possible and a piece of sterile gauze be placed over it. In removing all dirt and extraneous material, the nurse should be gentle and under no circumstances should the wound be probed, as further infection may take place. If no physician or surgeon can be had for some time, she should administer, in those cases of compound fracture that have been contaminated by the dirt from the street, a dose of 1,500 units of antitetanic serum if she can procure it. Should the patient have to be transported, she can splint the limb by laying it on pillows and tying a string or tape around the limb and pillows, just tight enough to cause the pillows to hug the limb snugly. A very useful splint may be made by folding a blanket in such a way that the ends form two long rolls between which the broken limb is placed. The blanket is held apposed to the limb by either a bandage or tapes placed at convenient distance from each other.

Dislocations are the displacement of either one or both bones of a joint. When such an accident occurs, the limb should be placed in a position which will relax so far as possible the structures involved, and the liberal use of cold applications may suffice to give some relief and at the same time limit the swelling which usually follows.

Contusion or *bruise* may result from the impact of a blunt instrument against the body surface or it may

result from a fall. Contusions are more or less painful and are usually accompanied by some swelling. The treatment should consist of keeping the part quiet; this is best done by placing the limb, if it is one of the extremities, on a splint. Should the pain and swelling be severe, cold application or some soothing lotion, such as lead and opium, may be applied.

Cuts and punctures. In this class of injuries the treatment will vary, depending upon their severity, as in deep cuts with gaping edges, the resort to sutures may be necessary in order to close the wound. In deep punctures by infected instruments, free incision may be needed in order to facilitate drainage. In the average case the duties of the nurse will be to disinfect the wound so far as possible. This may be done by bathing with boiled water to which has been added some antiseptic, or thoroughly coating the wound with tincture of iodine should she have this at hand. After the wound has been rendered aseptic so far as possible, it should be carefully enveloped in sterile gauze, and a light bandage employed.

Fainting is the temporary loss of consciousness produced by various causes; for instance, the sight of blood or an accident. Some people faint when in a crowd in a poorly ventilated room. This condition is sometimes more or less influenced by the condition of the stomach and also the general health of the individual, as those in a poor state of health are more likely to faint than the robust and strong, although it occurs in both.

When a person faints, he should be laid on the floor or on a bed or taken into the open if proper ventilation can not be had, as fresh air is all that in most cases will be needed. The clothes should be loosened about the neck and body, the face should be bathed in cold water, and a bottle of camphor or smelling salts should be held

close to the nose in order that the patient may inhale the odor, as both are somewhat stimulating. In the aged and weak, a small dose of brandy or whiskey may be given. The patient should remain quiet for a while, until the effect of fainting has passed off.

Snake bite is more frequently encountered in some countries than others, and in southern climates than in northern. In this country, the bite of the copperhead, water moccasin, and rattlesnake are the most poisonous. The symptoms are pain, which later becomes intense; swelling, which in some cases increases very rapidly; extravasation of blood. The patient may become drowsy, or may lose consciousness. If the poison is injected into a vein of any size, the result may be rapidly fatal, depending on the amount of poison injected.

When a person is bitten, a tight bandage or tourniquet should be applied proximal to the bite and the patient instructed to suck the blood from the wound; or better, after the circulation has been limited by the tourniquet, the site of the bite should be thoroughly incised and cauterized by carbolic acid or a hot iron. Stimulation with whiskey may be needed, but caution should be exercised in its administration, as some victims have died from the toxic effects of the liquor who would have in all probability survived the snake poison. The injection with a hypodermic syringe of a 1 per cent potassium permanganate solution is recommended as very effective and at present the use of a serum is said to act nicely, though this latter remedy has not been on trial long enough to prove its value.

Frostbite is the effect produced by cold. It usually involves the exposed parts of the body, such as the nose, ears, feet and hands. A numbness or sense of weight is experienced by some which is increased when the patient comes near the fire. The treatment consists in rub-

bing the parts with either snow or cold water, then a cloth saturated with alcohol which is followed by brisk rubbing with the bare hands and if the extremities are involved, they should be enveloped in a warm blanket. Under no circumstances should the patient sit near a hot fire or use hot water, as the circulation in the affected part should be induced to return slowly.

Fourth of July accidents have become so common that in some states the prohibition of fireworks was necessary. The toy pistol, fire crackers, and sky rockets all contributed their quota of injuries on this national holiday. In some cases powder grains are driven into the skin, while in others the wad from the blank cartridge is deeply imbedded. When an accident of this kind occurs, the wound should be cleansed of all powder, wads, and extraneous material, thorough irrigation with solution of bichloride of mercury 1:1000, and if possible 1500 units of antitetanic serum should be given as soon as possible.

CHAPTER XX

WAR NURSING

The Trained Nurse in War

While much has been said regarding the services of the trained nurse in hospital work, social settlement, mission nursing, and the services she has rendered in connection with health boards throughout the country, little if anything has been written about the wonderful self-sacrifice and untiring work of the professional nurse on the battle field. At the present time the nursing profession is singularly conspicuous for valuable services being rendered on the battle fields of Europe. In this respect it may not be out of place to say that the heroism of the Army and Navy is a legacy from brave sires, and equal to it is the splendid work rendered by the nursing profession of whose women the daring of hardships and dangers in their tender works of mercy was inspired with the spirit of the pioneer mothers whose splendid devotion made possible the subjugation of savages and turning a wilderness into the homesteads of a mighty nation. In every war in which the country has been engaged, some representatives of the nursing profession have stood out in bold relief for services which they have rendered, and with the first call to arms, simultaneously came the proffered services of the women.

The Red Cross Society, on whose roster some of the most eminent names in the nursing profession are enrolled, in all its different branches and several organizations has done untold good and its work has been recog-

nized not only by the President of the United States but by the rulers of other countries.

The Senate of the United States passed a resolution, without a single dissenting voice, tendering Miss Clara Barton and the Red Cross Society the thanks of Congress for services rendered in the Spanish-American War, which services could have been rendered only by women trained in the art of nursing.

The draft on the nursing profession in America at the present time is exceedingly heavy, as this country is engaged in war with the most formidable foe within its history; and while victory will be ours, it will not come without long and continued fighting, with the result that the casualty list will be long and the work for the nurse will be multiplied tenfold.

The nurse is working in this war under circumstances totally different from anything the world has heretofore known as regards the manner in which the warfare itself is conducted. This is a war that is being fought out scientifically, as new methods of destruction are constantly being invented by fertile brains on both sides.

Demands Upon the Nurse

From what is known at present of the demands made upon the nurse at the front, it is quite evident that she should be thoroughly prepared and as much time as possible should be spent in intensive training and preparatory work, as her duties will be varied and the hours long. Especially is this true after a severe engagement, as it not infrequently happens that a hospital that has a staff of doctors and a corps of nurses sufficient to care for three or four hundred patients may suddenly be called upon to care for six to nine hundred wounded men. The duties of the nurse then are twofold; first, the discharge

of her own duties, and second, directing or instructing those under her who may not have been so fortunate as she as regards a professional education, as many women are employed who hold no degree in nursing, but whose patriotism prompted them to offer their services, which in the absence of the more skilled and trained were accepted.

The nurse before entering the service should be sure she is physically all right, as the tremendous strain and long hours on duty may speedily render her unfit for the work, hence she becomes a charge instead of a help.

The nurse should provide herself with a few things before she goes to the front, such as rubber gloves, a pocket case, and a good hypodermic syringe. These articles are furnished but in a war of the magnitude of this one, it is at times hard to get supplies quickly; and while she may have only a few occasions to use these of her own purchase, there may be times when she will need them badly. The gloves should be worn as much for her own protection as that of the patient, as in this war as in no other has infection been so rampant.

This War Differs From Other Wars

This war differs from other wars in the great number of men engaged, the very great variety of destructive methods employed, such as bullet, shrapnel, high explosive shells from heavy artillery, bombs, gases of various kinds but all with deadly effect, hand grenades, etc., the soil over which the two armies are fighting and the means of transporting the wounded.

The nurse should understand that in all wounds, whether in civil life or in battle, there is a certain degree of inflammation. This does not necessarily mean infection; however, in the present war nearly all wounds

are infected. Some who are fortunate to receive prompt and thorough treatment recover quite rapidly, while those who are less fortunate and who may be compelled to lie out in "No Man's Land" for twenty-four to forty-eight hours, notwithstanding the first aid that they are themselves able to apply, are nearly always infected. The soil conditions of France and Belgium are conducive to this widespread infection, as for centuries the soil of these countries has been cultivated and manured and the earth is teeming with bacteria of all kinds, especially those derived from fecal matter and the pus-producing kind. The wounds are of such a nature as to encourage their growth, as they are of such a destructive character with much devitalized tissue that falls an easy prey to aerobic and anaerobic bacteria with their resulting consequences.

In the South African War, and in the Russo-Japanese War infection was present, but not to the extent of that seen in the present war. In the South African and Russo-Japanese Wars, the fighting took place over ground that had received little if any manure, and most of the fighting was done in the open. And again, many of the new devices for destroying human beings were not in vogue then as now, hence the widespread infection with its increasing mortality.

Most of the fighting so far has been trench fighting, so far as the infantry is concerned, the men standing for hours and sometimes for several days in a trench from seven to nine feet deep, the bottom of which is often full of water. The clothing as well as the body is often covered with mud, and the poor facilities, under such conditions, for the soldier to keep himself clean, render him more liable to infection when he is wounded than he would otherwise be.

Bacteria

The bacteria commonly met with in this war may be divided into two general classes, as follows:

First, those known as *aerobic*, that require oxygen for their existence. They are:

Streptococcus
Staphylococcus
Bacillus Pyocyaneus
Colon bacillus.

Second, those known as *anaerobic* that can not live in the presence of oxygen. They are:

Bacillus of Tetanus
Bacillus of Malignant Edema
Gas bacillus (or bacillus
Capsulatus of Welsh).

A wound may be infected with one or more of the above, some being more virulent than others; for instance, the gas bacillus or bacillus of either tetanus or malignant edema are far more deadly than those of the staphylococcic variety; however, any of these may endanger if not destroy life when permitted to multiply unchecked. Fortunately, there is developed within our bodies a substance that may for convenience be called "antitoxine," which resists the poison caused by the presence of bacteria. In some persons the power of resistance to pyogenic bacteria is quite marked while others offer little or no resistance; the former we speak of as being more or less immune, while in the latter class little if any immunity exists.

Immunity may be natural in some persons, meaning that they possess within their bodies a substance that

naturally inhibits the growth of, or destroys entirely, the bacteria that may have gained entrance; on the other hand, immunity may be acquired, as when a soldier is vaccinated or given a dose of antitetanic serum or antityphoid serum, he is thus rendered immune against smallpox, tetanus, or typhoid fever. Immunity thus acquired lasts for a variable length of time, usually two or three years; however, when exposure is great, it is well to give immunizing doses at closer intervals. In the present war, every recruit is required to be vaccinated and to take the antityphoid serum before he proceeds further with his training. The result is that both smallpox and typhoid fever have been practically eliminated from the troops.

The Transportation of the Wounded

In the present war the different methods for quick transportation of the wounded soldiers have been perfected to such an extent that it frequently happens that within a few hours after an engagement, the wounded begin to arrive at the hospitals located close to the first line trenches. The stretcher bearers bring the wounded to the first aid or dressing station, and from here they are sent farther back by other means of transportation. The automobile has been of inestimable value in moving wounded men as great numbers can be cared for in a short while. Keene states that the American Field Ambulance in France alone has four hundred ambulances and has transported three hundred thousand wounded men. The majority of ambulances are fitted with standard size stretchers so that when the wounded are brought from the front to the dressing stations or hospitals, they leave the wounded man on the stretcher and in return receive an empty stretcher with blankets, and return to the front for another load, thus saving time in trans-

ferring the wounded man, who is left on the original stretcher until final disposition is made of him. This not only saves time and enables the ambulances to make more trips but saves the soldier much pain and inconvenience by not changing him from one stretcher to another, and in many cases the question of life depends on the least amount of handling.

Sir A. A. Bowlby in the *British Medical Journal* describes the light railway ambulance trolley used in transporting the wounded; also the overhead trolley in the trenches used for quick transportation. Both of these have been the means of saving many a life by getting the wounded quickly to a place where they can receive prompt attention.

Hospital trains which operate between evacuation hospitals and base hospitals are equipped with every possible convenience, such as a modern operating room, an x-ray laboratory, and a diet kitchen, together with a full complement of nurses and surgeons who are in charge. It may be said that it is a modern hospital on wheels.

Attention to the Wounded

After a severe engagement, there is usually a sudden influx of wounded to the dressing stations and farther back to the evacuation hospitals, and still farther when their condition will permit them to be moved to the base hospitals. The nurse should at all times keep her wits about her and at no time allow the large number of soldiers suffering from wounds varying from slight to those of a most horrible and repulsive character to disconcert her. She should carefully examine every man entrusted to her care so far as possible to see that he is made as comfortable as possible.

She should find out the exact nature of his wounds

and their location, whether he is suffering from wounds caused by shell fire, burns, bullet or stab wounds, to see if a tourniquet has been applied or tight bandaging, possibly to control bleeding, if so see if they are too tight, which not only causes pain but may interfere with the circulation of the blood in the parts involved.

If a fracture, whether simple or compound, she should see that the splints are in place and are not producing undue pressure.

If the wound is not of the stomach and abdominal viscera, food and drink may be given, for it must be remembered that they may have been without either for a considerable period of time. The clothing should be changed and a bath given provided the patient's condition and wound will permit, as nothing so revives a soldier who has stood for days in water and mud as these little comforts.

The nurse should keep a careful lookout for those suffering from shock and render whatever services may seem indicated, such as the elevation of the foot of the bed. The application of heat, and the administration of stimulants, the subcutaneous or intravenous injection of normal saline will usually be done by the surgeon, however, she should have everything ready for such an emergency.

CHAPTER XXI

WAR NURSING (Cont'd)

Character of Wounds

In civic life, wounds seen are usually inflicted with pistol, gun or knife. They are generally single and most of them are sterile; while some are infected, those that are infected are usually with the pyogenic bacteria such as staphylococcus and streptococcus, while the wounds inflicted on the battle field are almost without exception infected not only with pyogenic organisms but in the present war a very large percentage are infected with the gas bacillus or the bacillus of tetanus and sometimes both.

Wounds received in battle are usually produced by bullet, shrapnel, shell fire from high explosives, and stab wounds, as those inflicted with the bayonet.

The shrapnel and shell wounds are murderous in character and the most frequent type seen. Bursting shell wounds are proportionately more dangerous because of the fact the fragments frequently carry into the wound clothing, dirt, and other foreign material; and again because of the devitalization of not only the tissues in the immediate tract of the missile, but all subjacent tissue is devitalized to such an extent that tissue necrosis speedily follows. It is in these cases that tetanus and gas infections are most commonly seen.

The severity of a bullet wound is proportionate to the distance; thus the maximum amount of destructiveness of a bullet fired from the modern rifle is attained at about

five hundred meters, as at this distance a large hole will be torn in the soft parts while a bone will be completely shattered.

The stab wounds produced by the bayonet are usually of the punctured or jagged variety, and are usually fatal when the wound involves the abdomen or the chest. Those from shrapnel or shell fire produce frightful mutilation of a bursting character. Those from the rifle are more or less round at the point of entrance and somewhat larger at the point of exit; however, when a soft nose bullet or the dum dum bullets are used, their wounds may rival those produced by shell fire.

It has been noticed that in order of their destructiveness to life, wounds of the head stand first; then those of the chest and upper extremities; and next to these are wounds of the abdomen.

Treatment of Wound Infection

In the treatment of wound infection in the present war, much has been learned that has been of inestimable benefit to the wounded soldier. In the early months of the war, much suffering was occasioned by wounds being infected and in many instances lives were lost to say nothing of the wholesale amputations that took place, all because no adequate means had at that time been devised to successfully cope with the rampant infection then seen. Things have changed—thanks to the efforts of Carrel and Dakin, who set about finding some method of rendering wounds sterile, which they succeeded in doing.

Dakin, after much experimentation, found that hypochlorite of soda solution of a certain strength, coupled with its method of application as suggested by Carrel, was the best method of rendering wounds sterile.

The Carrel-Dakin method may be divided into the

mechanical cleansing of the wound and the chemical sterilization or application of the hypochlorite solution to the whole surface of the wound.

The Mechanical Cleansing of Wounds

When patients after an engagement are brought to the hospitals, if they are in shock they are treated for this condition; if not, and their wounds and condition permit, they are given nourishment, made warm, and are bathed. The character of the wound is noted and whether or not important organs have been invaded by the missile. If the wounds be of the extremities, careful attention is given to the blood vessels and the nerve supply.

The x-ray is used to locate fragments of shell, bullet and other foreign bodies, this in conjunction with the electromagnetic vibrator of Professor Bergonie, the telephone probe, the Hirtz compass localizer, and other devices for the exact localization of foreign bodies have all aided materially in the treatment of wounds in the present war.

After the above preliminaries have been thoroughly accomplished, the patient is given a general anesthetic; in some cases when deemed advisable, spinal or local anesthesia may be used. The skin is sterilized with tr. iodine; the edges of the wound are trimmed, the wound is then laid open so as to thoroughly expose all pockets, the incision is always made when possible parallel to the long axis of the limb, all foreign bodies, blood clots, bruised and damaged tissue and loose fragments of bone are removed. Counteropenings for drainage are seldom if ever made and when done are frequently plugged so as to keep the solution in the wound, as the success of the Carrel-Dakin treatment depends on the solution coming in contact with the whole interior of the wound surface.

Wiping the wound out with gauze sponges does not suffice, as the tract of the missile and all tissue that is in any way damaged must be cut out smooth with a sharp

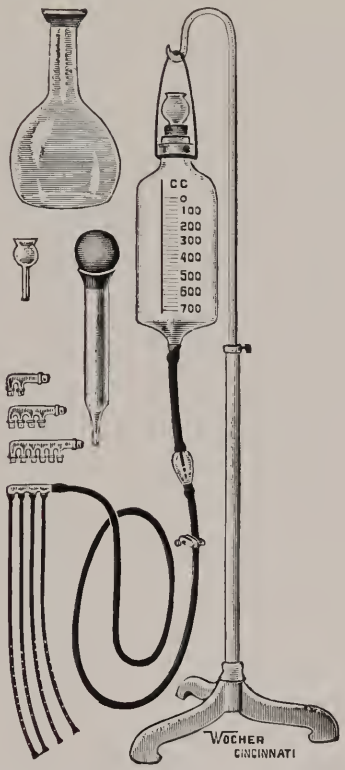


Fig. 104.—Dakin's instrument employed in applying Dakin's solution to wounds. It consists of 5 glass distributing tubes for using single or large number of rubber conducting tubes, the flask is used for mixing the solution and the syringe with rubber bulb is used in testing the permeability of the conducting tubes.

cutting instrument, as in this way and no other will the wound be entirely freed from extraneous matter and tissue of questionable vitality.

It is important to have complete hemostasis, as blood

clots in the wound form a fine nidus for bacteria and prevent the solution from having complete effect.

The wounds are left open and are never closed at the beginning for fear of subsequent development of infection; later, after the complete sterilization of the wound is assured, the wound is closed.

Chemical Sterilization of the Wound

There are two ways of applying the hypochlorite solution to a wound: One is by the instillation method, and the other is the continuous drip method. The latter is not so satisfactory and much less used than the former.

The apparatus used in applying Dakin's solution is a glass flask holding one quart, a long rubber tube known as the irrigating tube, one end of which is connected to the glass flask containing the solution, the other is connected to the distributing tube. The distributing tube is a glass tube from which several tubes are drawn at a right angle to the main tube, the number of these tubes varying from one to six, depending on the number of conducting tubes (Carrel) to be used in the wound.

The conducting tubes are small rubber tubes usually from ten to sixteen inches in length, and the sides for a distance of several inches are pierced by small holes through which the solution flows into the wound. Some of the conducting tubes are covered for an inch to three inches with bath toweling securely sewed to the tube so as not to come loose in the wound. This is intended to give more even distribution to the fluid.

The reservoir containing the fluid is placed between twenty and forty inches above the wound, and after the wound has been dressed and conducting tubes are in place, the nurse is instructed to release the pinchcock on the irrigating tube for a few seconds every two hours, thus permitting the fluid to flow into the wound.

It is not the object in this treatment to flush the wound, as is commonly done in civil practice with other antiseptic fluids, but just enough of the solution should flow in to "puddle" the wound. This part of the treatment is entrusted to the nurse and she should thoroughly grasp the idea of "puddling" the wound and not flushing it too much, as success or failure may depend on how well the nurse discharges her duty in this respect.

Another method of instillation is by means of a syringe, but this method is not much used as it requires much time and the services of several nurses, where many such treatments are to be given.

It should be stated that the use of the various conducting tubes, and as to whether one or more are employed in a given case will depend on the character of the wound.

The nurse will also be instructed how to find out whether or not the conducting tubes are plugged and if the solution is being thoroughly distributed over the surface of the wound, and thereafter this important duty will devolve upon her and any suspicion that things are not right should be brought to the attention of the surgeon immediately.

The permeability of the conducting tubes is tested with a glass syringe on the end of which is a rubber bulb.

Dressing the Wound

The conducting tubes are inserted into the wound and kept in place by gauze placed in the wound opening, the skin is protected from the irritating effect of the solution by means of strips of gauze that have been sterilized in vaseline. These strips are laid around the margin of the wound and extending on to the skin for a distance of from three to six inches, depending on the size and location of the wound. Over all this is laid a pad made

of one layer of nonabsorbent cotton and one of absorbent cotton, around the whole of which is placed sterile gauze. The side of the pad that contains the absorbent cotton is placed next the wound. Care should be exercised in placing pads over the wound, that the tubes are in no way pressed upon. A pad is placed posteriorly so that the edges of the pads meet on the sides of the limb. The pads are now pinned with safety pins, thus dispensing with bandages. The tubes are fastened to the dressing with either safety pins or adhesive tape.

Bacterial Examination of Wounds

In conjunction with this method of treating wounds, the bacterial examination of the wound is of great assistance as it indicates the progress toward sterilization the wound is making. The accuracy of these examinations, while not exact, imparts sufficiently accurate information to enable the surgeon to state with a reasonable degree of certainty on what day the wound may be closed. In many hospitals at the front, the nurse is instructed to do this work, as it is simple and easily understood.

A sterile platinum loop is placed into the wound where there is a likelihood of there being bacteria. On the loop of platinum will be some secretion from the wound. This is placed on a sterile glass slide and allowed to dry. The nurse then stains the smear on the slide with a drop of carbolized thionin. After a few seconds this is washed off with water and the slide is again dried. The slide is now ready to be counted. A drop of cedar oil is now placed on the slide which is examined with a microscope, using a No. 1 eyepiece and a 1/12 oil immersion lens. The bacteria are now counted in the microscopic field; as Carrel states, when the number in a

field exceeds fifty or one hundred, it is useless to count them more precisely. The examinations are made at the time of dressing the wound or oftener if need be, and the count one day is compared with that of the preceding day so as to note any decrease in bacteria, which means sterilization is progressing nicely, or any increase in the number of bacteria which indicates that infection is progressing.

There are some objections to hypochlorite solution: First, it is very irritating to the skin; second, the exact strength must be maintained, as when below 0.45 per cent, the germicidal action is too weak, when above 0.5 per cent it is too irritating; third, the solution becomes inert after it loses its chlorine and must be replenished at stated intervals, usually two hours.

In order to overcome these difficulties, Dakin has proposed the use of another synthetic chloramine called "Dichloramine-T." This is nonirritating and is dissolved in eucalyptol and paraffine. The solution is used in strengths of 5 per cent or 10 per cent and its germicidal properties last for twenty-four hours. Dichloramine-T may be applied on gauze or sprayed or the wound may be filled with it.

Other Antiseptics

Many of the antiseptics commonly employed in civil life are also used, such as bichloride of mercury, boric acid, iodine, carbolic acid, and potassium permanganate. Besides these, many new antiseptics are being used, such as acriflavine, proflavine, and brilliant green. As to the merits of these new antiseptics, continued use in the hands of competent and impartial surgeons will tell.

Hypertonic saline solution advocated so strongly by Sir Almroth Wright, is used by some surgeons at the

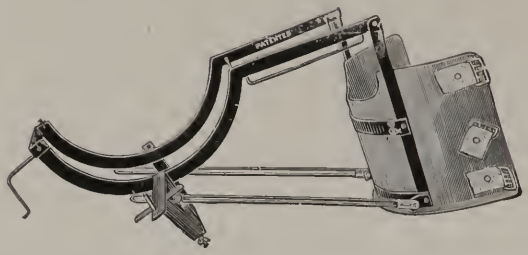


Fig. 105.—Aeroplane splint used in treatment of compound or incisional fracture of arm and forearm.

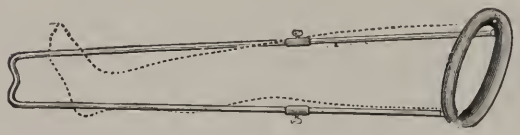


Fig. 106.—Robert Jones' modification of Thomas' splint for thigh and leg, also used to fix limb while transporting patient.

Fig. 107.—Robert Jones' leg splint for fractures of lower portion of leg.

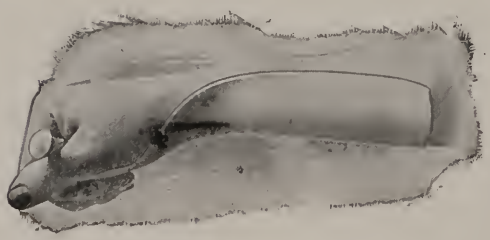


Fig. 108.—Walker's splint for wrist and forearm.

front; however, the results of wound treatment by this method in the hands of many competent surgeons have not been as good as that attained by the use of Dakin's solution.

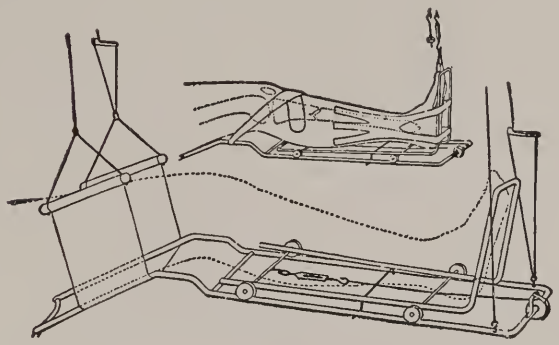


Fig. 109.—Railway splint. An aerial suspension splint for the treatment of fractures of the femur and tibia.

Fractures

The type of fractures seen in war hospitals differs very much from those seen in civil life, because nearly

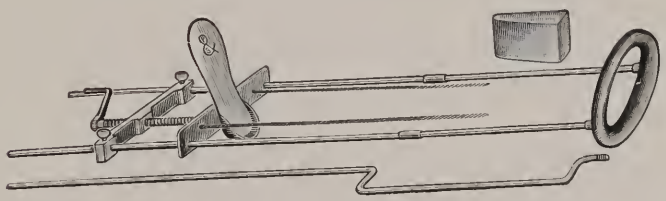


Fig. 110.—Blake's modification of Wallace's extension splint for gradual extension.

every compound fracture received on the battle field is infected and there is extensive shattering of the bone. The shattering, whether of the long, short, or flat bones is due to the high explosive effect of the projectile.

In the treatment of fractures, the nurse will be called upon to render no small amount of service. Should the fracture be compound, after it has been dressed the nurse should be exceedingly careful in handling the limb so as in no way to disturb the position of the bones; she should see that bandages do not bind the limb unduly, thereby producing discomfort. Also, she should be constantly on the alert for signs and symptoms of infection, such as any discharge from the wound, rise of tempera-

Fig. 111.—Robert Jones' elbow splint for immobilization of joint.

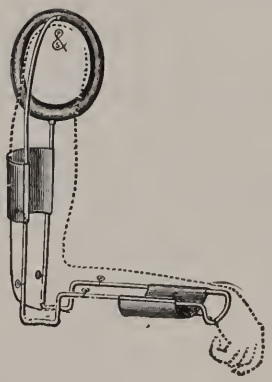


Fig. 112.—Robert Jones' humerus extension splint for fractures of middle and lower shaft.

ture and pulse, chilly sensation, or increase in bacterial count. The surgeon's attention should be called to any of these symptoms at once.

Compound fractures are treated as other infected wounds in so far as irrigation is concerned, as nearly all compound fractures are treated with Dakin's solution, which the nurse will see is carried out correctly.

The treatment of simple fractures after they have once been properly reduced and immobilized usually amounts to very little unless some complication arises that neces-

sitates redressing. There have been a number of devices introduced for holding fractured bones in position while some of the older appliances are still used with success; such as Buck's extension, the Balkan frame, plaster of Paris and starch and bandages.

In compound fractures where the wound requires dressing, splints have been so devised that dressing is easily accomplished without any disturbance of the position of the bones.

CHAPTER XXII

WAR NURSING (Cont'd)

Head Injuries

Wounds of the head are frequently seen, notwithstanding the universal use of the steel helmet. Wounds involving the face, neck, and lacerated wounds of the scalp are dressed close behind the lines at first aid dressing stations; however, those cases requiring more extensive operation, and especially those wounds of the head in which the brain is involved, are sent farther back to base hospitals where all conveniences possible can be had, as it has been clearly shown that in cases where there is brain involvement the patient has a better chance to recover when sent to a base hospital where everything can be done for him, than to operate upon his arrival at the first line dressing stations, as in the latter his chances for infection are great.

The nursing of head injuries in which the wounds are slight will be comparatively easy; but in those grave cases where the projectile has done much damage to the skull and brain, the nurse will be expected to exercise the greatest judgment and skill as so much depends on skillful nursing in these cases. She should acquaint herself with certain symptoms of brain injury so as to be of the greatest assistance to both the patient and surgeon. She should note carefully the character of the pulse which is usually slow, any unusual headache, irregular pupils, twitching muscles, stupor, unconsciousness or paralysis. Any one of these symptoms may be a signal of impending trouble.

In the treatment of head injuries, the nurse will be particularly struck by the amount of damage the brain can stand and the patient recover.

Upon the arrival of a soldier with brain injury at the base hospital, the head is shaved, an x-ray plate is taken, the wound is freely opened and devitalized, and infected brain tissue together with all spicules of bone and foreign bodies removed. The use of the electromagnet is extensively employed in removing the missile from the brain. The operation is concluded with closing the wound either with or without drainage, rubber tubes being used in preference to gauze for this purpose on account of the tendency of gauze to become entangled in brain tissue, which makes its removal difficult.

Hemorrhage is thoroughly checked by means of ligature or muscle implantation or bone wax.

After operation, the patient is placed in bed with head elevated. The nurse should see that the patient is made comfortable in this position. Nourishing diet, pleasant and quiet surroundings, all contribute much to the comfort and speedy convalescence of these patients.

Wounds of the face seen in this war are often frightful, as the whole upper or lower jaw or nose or other portion of the face may be shot away. The development of plastic surgery together with the wonderful services rendered by the dental units have in many instances restored the face to near normal, thus avoiding the horrible disfigurement which the patient would otherwise be compelled to carry through life.

Chest Wounds

Chest wounds will form a very interesting chapter in surgical works written after the war, as much has been learned as to their management.

In considering wounds of the chest it is necessary to remember that within its bony walls many organs are located that are necessary to life.

Injuries may be inflicted with bullet, shrapnel, or bayonet. The damage done depends on the character of wound, as a ball going through the chest wall and lung, provided no large vessels are severed, will cause no great destruction of the parts traversed, while those from shrapnel usually produce considerable damage and not infrequently pieces of the projectile remain in either the pleural cavity or the lung.

Those wounds produced by the bayonet are as a rule quite dangerous, as the weapon is usually driven with considerable force and at close range and quite often penetrates the mediastinum or severs some of the large blood vessels. The mortality in chest wounds differs at various dressing stations and base hospitals. It has been stated that, taking a large number of chest wounds, the mortality will average 20 per cent.

Death is due, as a rule, to hemorrhage, sepsis, or pneumonia. Many wounded die in a few hours from hemorrhage and many who escape this die from sepsis later, while quite a number die as the result of pneumonia.

It has been proved that the opposite lung will be damaged to considerable extent. This is usually hemorrhagic in character.

In the treatment of wounds of the chest, rest in bed for a considerable period of time is of the utmost importance, as it minimizes the chances for hemorrhage.

Strapping with adhesive so as to thoroughly immobilize the chest on the affected side is of prime importance. In the absence of hemorrhage, rest and immobilization are the principal points to be remembered in treating injuries to the chest and its contents.

In those cases where blood has accumulated in suffi-

cient quantity, aspiration will have to be resorted to; and in cases where infection has occurred, and pus formed in the pleural cavity, thorough drainage by means of rib resection with the insertion of tubes will be found necessary.

In infected cases, the use of Carrel-Dakin method is of great assistance, as convalescence is materially shortened. Hemorrhage may be controlled by packing the cavity or by suture of the lung tissue.

Patients should be kept in a pure atmosphere and abstain from undue exercise during convalescence.

In those cases that require drainage, the nurse will see that the drainage tubes do not become blocked and she should use extra care during the dressing of a case to prevent the tubes from being drawn into the pleural cavity, thus necessitating another operation for their removal.

Abdominal Wounds

In the Spanish-American War, many wounds of the abdomen were seen that recovered completely without operation. This was due to the small steel ball then in use. In the present war, wounds of the abdomen are not only from bullets but from shrapnel shell and its contents, bombs, grenades, etc. The wounds are frequently multiple and involve one or more of the intra-abdominal organs; then again, wounds seen in the present war are almost without exception infected.

In previous wars, the tendency has been to defer operation; but in the present war, all patients with abdominal wounds are operated upon as early as possible, there being two conditions only which should cause postponement: the first are those cases in which there is unmistakable evidence that the peritoneal cavity has not been invaded; and the second are those cases in

which the patient is profoundly shocked, in which case proper treatment promptly instituted for the latter condition may safely tide the wounded man over into a safely operable state.

The nurse will see, after an engagement, many who are suffering from both penetrating and nonpenetrating wounds of the abdomen, as Lockwood and his associates state in the *British Medical Journal* of March 10, 1917 that in one night between nine and twelve o'clock, ninety-six operative cases were brought in, of which thirty-six were abdominal; and of this number thirty-two were operated upon.

In general, the treatment of all penetrating wounds of the abdomen consists in locating and removing all foreign bodies, suture when possible, of all organs that have been punctured unless in the kidney, when the vessels and the parenchyma have been destroyed, where nothing short of removal will suffice, or in the intestines where resection offers the best chance for recovery. Resection of the intestine carries greater risk than simply suturing the punctures, and is resorted to only when the latter procedure will not suffice.

Drainage is not as a rule employed; however, in some cases it may be deemed advisable, in which case pelvic drainage or drainage posteriorly may be instituted. In the latter it is done in those cases of wounds of the colon to prevent retrocolic infection. After operation the patient is placed in the Fowler position to facilitate drainage away from the upper abdomen and diaphragm. No enemas or food should be given for several days, only water in half ounce quantities at regular intervals, and should nausea set in, this should be withheld. In cases that are in profound shock, water may be administered

intravenously, as in this state little if any absorption takes place when given subcutaneously.

Much depends upon the attention given these patients by the nurse after operation, as many cases have been nursed to a successful issue that in the beginning looked hopeless, thus proving that the service of the nurse stands second to none, in such cases.

CHAPTER XXIII

WAR NURSING (Cont'd)

Gas Infection and Gas Gangrene

Probably of all infections seen at the hospitals on the battle field, that the nurse will be called upon to attend, that produced by the gas bacillus is not only the most frequently encountered but the most virulent, destroying life sometimes within a remarkably short time.

Gas infection and gas gangrene are produced by the gas bacillus of Welsh, which is anaerobic. Gas gangrene follows gas infection in those cases where there is extensive devitalization of the tissues and where the bacilli have been carried to great depths.

Judd (*Surgery, Gynecology and Obstetrics*) says the soil over which the armies are fighting, the weather, the clothing, the skin, projectiles, and character of the wounds all are conducive to the growth and formation of the gas bacillus.

The weather is damp, cloudy, and much humidity exists in France and Belgium at certain seasons. The clothing is usually soiled and not infrequently covered for days with mud. The chances for keeping the skin clean are none too good, and especially is this true when an important engagement is to take place. The character of projectiles used, such as pieces of shell, hand grenades, bombs, and shrapnel, produce wounds the character of which render them peculiarly susceptible to infection, as they are often multiple, extensively lacerated, and quite often the missile does not go through

the tissues but remains in the body with clothing and dirt, until removed.

The symptoms of gas infection may come on suddenly or may not show up for several days. There is usually pain, swelling, rise of temperature, accelerated pulse, and a fine crackling sound is produced when pressure is made over the infected area. This last symptom is called "crepitation," and is caused by the formation of gas in the tissues. The limb changes in color, usually from normal to a livid, thence to a dark hue, the discharge may be brownish in color, and has an offensive odor.

The gas may invade the muscular planes and cellular tissue over the entire limb and extend over the body.

When the infection has been deep and extensive, gas gangrene usually follows. This latter condition is exceedingly grave, and unless it can be arrested promptly, death speedily ensues.

Gas infection is very rarely seen in the head and neck, not often in the thorax, and most often in the lower extremities: This is explained by the fact that the gas bacillus is anaerobic and that the head, neck, and thorax are so well supplied with blood, which supplies the necessary oxygen.

The prognosis in gas affection and gas gangrene depends on how quickly the man receives treatment, and on how thoroughly the wound is sterilized.

The treatment of gas infection and gas gangrene is as follows: The wound is laid open thoroughly, all missiles, dirt, clothing, and foreign material removed, the wound is sterilized, with either Dakin solution, salt water, hydrogen peroxide, iodine solution, carbolic acid, Chlumsky's solution, or Merciere solution. Not infrequently deep incisions four to six inches long are made parallel to the long axis of the limb and over a con-

siderable area of the infected part. In case gangrene is threatened or present, amputation well above the affected portion is the only treatment that offers much hope of relief. The limb should not be bandaged as all encouragement should be given the gas and discharge to escape.

It has been stated that a serum may yet be produced that will successfully check the ravages of this dreadful infection.

Tetanus

Those nurses who saw service in the early months of the present war saw many cases of tetanus; however, the free use of antitetanic serum as now practiced at the front has reduced so appreciably the number of cases and the mortality that it may be said that it is rare now to see a wounded man die from tetanus if he has received early enough, the proper treatment.

The same condition of the soil, clothing, skin, and the character of wounds, referred to under "Gas Infection" holds good for tetanus, the tetanus germ being essentially anaerobic in character.

The nurse will be expected to call the attention of the surgeon to any symptoms such as hardness or rigidity of the adjacent muscles, sensitiveness to sound or light, increased reflexes as the nerves in the wound are attacked by the tetanic germs, which in turn transmit their impulses to the cord or central nervous system and thence to the brain. The infection does not travel by the blood current. To make a diagnosis of tetanus after well defined symptoms of lockjaw are present, is to allow the patient to pass from a safe period to one in which there is little hope of saving life. It is on this

account that the nurse should keep a constant vigil over every case of wound infection.

The treatment of tetanus may be said to depend almost entirely on the administration of the serum. The practice of giving to every man wounded a dose of antitetanic serum either on the field or upon his arrival at the first dressing station has prevented much suffering from this terrible disease. It is customary to give an initial dose, 500 units, as soon after the injury as possible, and as the effect lasts only about ten days, it is necessary to administer a second dose seven days after the first; and should conditions demand it, a third dose may be given. Tetanus has been known to develop quite a number of days after the patient's wound had healed, and in a number of cases where it became necessary to perform a secondary operation, tetanus has very unexpectedly developed. Hence, in all cases where any operative procedure is contemplated, it is wise to give the serum two or three days before.

These late cases of tetanus are spoken of as delayed tetanus, for the symptoms of which the nurse should be constantly on the lookout.

It might be well to state that the administration of serum is in most hospitals entrusted to the nurse, and it behooves her to have at hand a supply of serum so there will be no delay in its administration.

The injection of a solution of magnesium sulphate in the muscles near the wound has some effect in lessening the spasm. Its use by some surgeons is questionable while others claim much for it.

The free incision and liberal use of Dakin solution, potassium permanganate or iodine should not be neglected.

The use of morphine in ¼ grain doses frequently re-

peated is probably the most effective remedy in relieving pain. The patient's general condition should be improved so far as possible.

Burns

Burns are, without doubt, the most frequent injury met with in civil life, and the liability of late years seems to have increased in direct proportion to the invention of machinery and progress of civilization and science.

Since almost the beginning of the war abroad, we have heard from time to time about the frightful burns caused by modern high explosives.

There is no injury that causes more agonizing pain and protracted suffering and so often condemns the unfortunate victim to a lifelong mutilation of the most distressing and repulsive character.

The severity of a burn depends on the character and degree of heat, the length of time it is applied, and the thickness of the cutaneous structure. Thus molten lead or caustic acids will produce more destruction in the same length of time over the same area than hot water or steam, and it requires a longer application of dry than moist heat.

The degree to which a patient is burned is more or less influenced by the character of fabric covering the skin, as when the surface is covered with silk or cotton, the damage is considerably less than when covered with wool. Again, burns are more severe with tight fitting garments than when loose ones are worn, because the heat is more directly applied in the one than in the other.

As burns are usually on the surface of the body and may involve one or more layers of the skin, it is well to

pause for a moment and take a hasty resume of the physiology of this important covering.

It may be roughly stated that the skin performs from one fortieth to one fifteenth of the entire respiratory function. The absorptive power of the skin (unbroken) is a debated question, though weight of opinion is that it has power to absorb, though in small amount. Thus it will be noted from the foregoing that an area of skin large enough to cover the body of an average person plays a most important part in the excretory function; for example, a person five feet eight and one-half inches high, weighing one hundred and fifty pounds, should have approximately 2,325 square inches of skin, or over sixteen square feet of evaporating surface. It can be readily seen how burns, involving considerable area and depth, would affect the health of the individual.

The prognosis of burns may be considered from two viewpoints:

First, as to life.

Second, as to the usefulness of a member, and the cosmetic effect.

With reference to the latter, the terrible deformity resulting from injuries of this character, sometimes renders the patient unfit to earn a livelihood, and in the treatment all possible care should be taken to avoid such complications. Burns about the extremities are the ones, as a rule, that incapacitate patients most, and those about the face and neck are often followed by extensive cicatrization, which produces the most horrible disfigurement.

Several things must be considered in the prognosis as to life in cases of extensive burns.

First, the age of the patient.

Second, condition of patient's health at the time of the injury.

Third, area and depth of the burned surface.

Fourth, location of the burn.

Fifth, resulting complications.

Age of Patient.—It is a well-known fact that young children do not stand burns well, as they are particularly liable to the numerous secondary visceral complications which are frequent sequelæ of burns, and are especially ill calculated to resist them. Thoracic and cerebral complications in children are out of all proportion, even in slight burns, to that of grown people. The aged are likewise affected and resist these injuries poorly, hence the prognosis in both is grave.

Health of the Patient.—Those patients who have been burned and who are suffering from tuberculosis, syphilis, gout, nephritis, or any constitutional disease which tends to lower their resisting power, will stand injuries badly, as any of the above mentioned complications may materially affect the outcome of a case.

Alcoholics are prone to succumb after burns, as their powers of resistance are lessened, and are more liable to visceral complications than nonalcoholics.

Area and Depth of Burned Surface.—It has been said that if one third of the body area was burned, the chance of recovery is slight. The author had a man burned over considerably more than half of his body, who made a complete recovery. It sometimes happens that small areas are followed by death due to shock and other complications; and when large areas of the body surface have a burn of the first degree, the shock and pain, together with the kidney complications, which are apt to follow, render the prognosis doubtful.

Location of Burn.—Burns of the chest are of all burns the most fatal. Particularly is this true with children and old people. Burns of the neck may be followed by laryngeal inflammation and edema of the glottis, and those of the face and head by erysipelas and cerebral involvement. When located on the limbs and back, where the skin and muscles are thick, they serve to protect the adjacent viscera and are less fatal.

Resulting Complications.—Many of the complications following burns have been referred to in the foregoing; however, such complications as cerebral, visceral, sepsis, and kidney lesions are probably the most important, and in a case where any of these arise, the prognosis should be extremely guarded.

Treatment.—It can be readily appreciated that patients suffering from extensive burns require the most sedulous attention on the part of the attending surgeon to procure healing of large areas and to prevent if possible any deformity, to support the patient's strength, and to meet with intelligent treatment any threatened complication that may arise. Many remedies have been suggested, some of which possess real virtue, while others are of no value whatever.

Picric acid, used extensively by the French surgeons in strengths of 1:50 to 1:100 by moistening a piece of gauze and placing it over the site of the burn has given good results; this, however, in the hands of many surgeons has given no better results than other less objectionable remedies, as it imparts a yellow stain which is hard to remove and it has been known to produce carboluria.

A solution of Epsom salts applied on gauze and kept moist, is most useful, as it relieves pain, reduces inflammation, is nontoxic, is cleanly, and is easily obtained.

The continuous bath of either normal saline or sodium bicarbonate has been especially useful, this method being both simple and efficacious.

Alcohol placed on a fresh burn of the first degree will relieve pain and inflammation in a remarkably short time.

Within the last three years, there has been introduced to the profession a method which is as unique as it is useful. It is the method of applying fresh amniotic membrane to the burned area. All cases in which this treatment has been used were burns of the second and third degree, and under the usually accepted methods of treatment, by skin grafts, etc., would have entailed more suffering, would have been more difficult to dress, and last but not least would have necessitated a much longer stay in the hospital. The method is as follows:

The amniotic membrane from a healthy placenta is procured, the membrane cut in strips of sufficient size to cover the burned area, the inner side of the membrane is applied to the denuded surface, the whole surface is then covered with a mixture of paraffine, beeswax, and castor oil. The paraffine and beeswax are melted, and enough castor oil is added to make it fluid; this is applied with cotton applicators or pledgets of cotton on toothpicks, using a fresh one each time. The dressing is changed on the second or third day when a similar one is applied.

Those who have not used this method will be surprised how quickly a large surface can be covered with healthy skin. It might be stated that after the dressing has been removed, the surface should be gently irrigated with normal saline solution, care being taken to not disturb the islands of epithelium. Before using, the membrane should be thoroughly cleansed of all blood and serum,

and it should be positively known that the woman from whom it is obtained is free from disease. The application of the wax dressing should be smooth so as to exclude all air.

Perhaps of all that has come to us from abroad, the treatment of burns seems to be one of the best things so far. The burns in this war have been so numerous and extensive, from the nature of the explosives used, that some expedient had to be devised that would hasten the healing of large areas. They claim for the paraffine method the following:

That it is easy of application.

That it relieves pain promptly.

That it heals large surfaces denuded of skin in an incredibly short time.

That it produces a soft and pliable skin.

The method consists in spraying a mixture of resin and paraffine, which has been melted, over the raw surface and covering this with a thin layer of sterile absorbent cotton over which the mixture is applied again. This is peeled off each day and a new dressing of the same mixture is applied until the wound is healed.

When the wounds are ready for this treatment they are dried by means of an electric hair drier. This method was first used by a French surgeon (Dr. Barthe de Sandfort) who lays great stress on the particular kind of paraffine and the method of its preparation. Most surgeons are of the opinion that the paraffine and resin possess no curative value, but the merits lie in the proper application. It should be melted and maintained at 70° C. while being applied. It is sprayed on the surface by means of an atomizer, care being taken not to let it get on the sound skin, as it produces, at this temperature, some pain. It can not be applied successfully with a

brush, as this seems to produce pain, and the surface can not be evenly coated.

Fig. 113.—Caldwell's paraffin sprayer.

Fig. 114.—Hamilton's hot-air douche used for drying the burned surface preparatory to receiving the paraffin.

There have been quite a number of variations in the manufacture of the paraffine dressing and also in its

method of application. All have agreed that the most satisfactory way to apply it is with some form of spray or atomizer, as the surface is not only unevenly coated but some pain is produced when the application is made with a brush or cotton swabs.

Stanolind Surgical Wax made by the Standard Oil Company has given good results. It is applied by means of a sprayer after the wound has been thoroughly cleansed and dried.

Shell Shock

This peculiar condition is produced by the bursting of high explosive shells close to the soldier, causing a rarefaction of the air in his immediate vicinity. The condition is one that the nurse will quite often see, and if she is skillful in handling nervous and hysterical patients, she should succeed admirably with patients suffering from shell shock. In many cases, there is no evidence of the patient's having been wounded, as no mark on his body exists, still he is severely shocked.

This condition is seen mostly in those who have an unsteady nervous system, probably from heredity. Shell shock may vary in intensity from being slightly dazed to a condition of profound unconsciousness. The man may walk to the nearest dressing station in a dazed condition. He nearly always has some disturbance of the special senses; as, his vision is usually blurred and photophobia is present in many cases, his taste and smell are both affected, he can not articulate well, and deafness is frequent in patients suffering from shell shock.

The treatment of these cases is usually passed up to the neurologist, though the surgeon sees many such cases. The patient should be put to bed for several weeks; he

should be assured he will recover; the nurse should be tactful in conversation with him, and at all times impress upon him that both the surgeon and herself thoroughly understand his case, that many others in a similar condition have recovered, and so will he. The use of electricity, nourishing food, and removal so far behind the lines that he will be completely out of sound of the guns—all these measures tend to bring the soldier back to normal.

In cases where there is any cardiovascular disturbance, the proper treatment will of course be prescribed by the surgeon in charge.

The nurse should exhibit the greatest amount of patience, as the convalescence in these cases is, as a rule, long.

Trench Diseases

Trench foot is a condition caused by standing in trenches that contain water for a considerable length of time. It is thought to be parasitic in origin. There is usually swelling, redness, and a prickly sensation. The treatment consists in placing the patient in bed, mild antiseptic lotions should be applied; it has been found in some of the German hospitals that a solution of sulphate of copper has been very efficacious.

Trench frostbite is also produced by long exposure in the trenches in which there is water. The condition resembles, to a certain extent, the frostbite seen in civil life. The treatment is practically the same as that of frostbite.

Gas Asphyxiation

Perhaps of all the diabolical things invented by the Germans to destroy life since the war began, the asphyxiating gases used first by them are the most insidious as well as the most deadly.

Asphyxiating gas was first used by the Germans during the second battle of Ypres in 1915. Then, the gas used could be more quickly detected than that used at the present time, and when the alarm was sounded, the men usually had time to put on their gas masks, and take all necessary precautions against it. At present, the gas is contained in a shell from which it is liberated.

The "mustard gas" as it is called, has a pungent odor, and so irritant is it that soldiers passing over ground that has been moistened with the liquid contents of the shell which in turn generates the gas, have been burned by it. The exposed parts are affected most, such as the face, hands and arms. The soldier may not know for some hours that he has been gassed unless he has inhaled quite a quantity, in which case the effect is immediate and profound.

The milder cases suffer only from a slight burn of the skin over the exposed parts, lacrimation, conjunctivitis, laryngitis, and bronchitis; these cases, with proper care, recover quickly; however, those of the more severe type not only have those symptoms enumerated above, but usually have bronchopneumonia with bloody or purulent expectoration, and in some pulmonary edema. In all cases, there is more or less pain in the region of the stomach and difficulty in breathing.

The treatment of gas poisoning will, of course, be directed by the physician in charge; and while nothing of a specific nature can be done, they can be relieved by the use of opiates such as heroin or codein. These drugs not only relieve the severe pain, but allay to a considerable extent the cough which is ever present. The patient should be in dry quarters, and inhalation of oxygen given. The complications should be treated accordingly, should any arise.

GLOSSARY

Names of Operations and Diseases Commonly Met with in Surgical Nursing

Appendectomy. The removal of the appendix vermiformis.

Appendicitis. Inflammation of the appendix. It may be acutely inflamed and subside, or may get progressively worse and become gangrenous and rupture, or it may be chronic, in which case the patient has usually had more than one attack and there are always present adhesions.

Carcinoma. Commonly called cancer; carcinoma is a malignant growth.

Cervicitis. Inflammation of the membrane lining the cervical canal.

Cholecystectomy. Excision of the gall bladder.

Cholecystotomy. Opening of the gall bladder by means of an incision through the abdominal wall.

Cholecystitis. Inflammation of the gall bladder; may be acute or chronic, and is frequently associated with gallstones.

Colostomy. This is an operation by which an artificial anus is made by making a large opening into the colon.

Cystitis. Inflammation of the bladder.

Embolus. An embolus is the detached portion of a clot of blood; and while an embolus may lodge in any vein, it is commonly found in the femoral or the pulmonary vein.

Empyema. This is an accumulation of pus in the pleural cavity, which is removed either by aspiration or the resection of a portion of one or more ribs.

Endometritis. Inflammation of the membrane which lines the uterine cavity. It may be acute or chronic in character.

Enterorrhagia. The discharge of blood from the bowel.

Epistaxis. Nose-bleed.

Extrauterine Pregnancy. In this condition, the pregnancy takes place outside the uterine cavity, commonly in the tube or in the tube-ovarian; that is, between the tube and the ovary.

Fibroid. This is a tumor made up of fibrous tissue and is not primarily malignant, though it may ultimately become so.

Floating Kidney. This is a condition where the attachment of the kidney to the back has become elongated; it may be unilateral or it may be bilateral.

Fracture. Fracture is the breaking of a bone; it may be a simple bending and is then known as a green stick fracture; or it may be a break, and is then called a simple fracture; or it may be comminuted—that is, where the bone is broken into several pieces; or it may be a compound fracture where the bones protrude through the skin or where there is an open wound leading to the site of fracture.

Gastroenterostomy. Operation of making an opening between the stomach and intestines.

Hematemesis. The vomiting of blood.

Hematuria. The passing of blood with the urine; the blood may be from the kidneys, ureter, bladder, prostate, or urethra.

Hemorrhoids. Hemorrhoids or piles are enlarged veins in the lower portion of the rectum; they may be external and protrude from the anus, or located above the sphincter muscle, in which case they are called internal piles or hemorrhoids.

Herniotomy. An operation for the cure or closure of a rupture.

Hysterectomy. Removal of the uterus; when done by opening the abdomen, it is called *abdominal hysterectomy;* and when removed through the vagina, it is called *vaginal hysterectomy.*

Ilio-sigmoidostomy. This is an operation intended to short circuit the fecal current by making an anastomosis between the ilium and sigmoid.

Laparotomy. An operation on any of the organs within the abdominal cavity by an incision through the abdominal wall.

Laryngectomy. An operation for the removal of the larynx.

Laryngotomy. An operation for opening the larynx by means of an incision.

Lipoma. A tumor composed of fat.

Lithotomy. The operation for the removal of stone in the bladder by cutting. This was done by the older surgeons almost exclusively through the perineum.

Lithotrity. The crushing of a stone in the bladder by means of an instrument called a lithotrite which is inserted through the urethral canal.

Metritis. An inflammation of the parenchyma of the uterus.

Myomectomy. An operation for removal of the myoma, usually from the uterus.

Nephrectomy. Excision of the kidney.

Nephrolithotomy. Operation for the removal of a stone in the kidney.

Ovariotomy. The removal of one or both ovaries.

Perineorrhaphy. The repair by suture of the perineum after laceration caused by the passage of the child during childbirth.

Periostitis. Inflammation of the periosteum covering the bone.

Peritonitis. This is an inflammation of a portion of the peritoneum and is called local peritonitis, usually found in the pelvis, or it may involve the whole of the peritoneum, in which case it is spoken of as general peritonitis. The character of peritonitis may be simple, acute, or septic.

Prolapse of the Rectum. A downward displacement of the rectum.

Prolapse of the Uterus. This is a downward displacement of the uterus and its appendages.

Rectal Fistula. This is an opening from the lumen of the bowel into the tissues, called a blind fistula; or, it may extend from the lumen of the bowel through the tissues and open on the outside, this being known as a complete fistula.

Rectovaginal Fistula. This is an opening through the rectum and vagina.

Salpingitis. Inflammation of the Fallopian tube. Three varieties are commonly met with; namely, hydrosalpinx, haematosalpinx, and pyosalpinx. In hydrosalpinx there is dropsy of the tube; haematosalpinx is an accumulation of blood or hemorrhage into the tube; pyosalpinx or pus tube is, as the name indicates, a collection of pus in the Fallopian tube.

Salpingo-oophorectomy. This is the operation for excision and removal of the Fallopian tube and ovary.

Sarcoma. Sarcoma is a destructive malignant growth.

Suprapubic Cystotomy. The removal of stone or tumor in the bladder by cutting through abdominal wall above the pubic bone.

Trachelorrhaphy. The closure by sutures of a laceration of the uterine cervix.

Tracheotomy. Cutting into the trachea for the purpose of admitting air into the lungs.

Trephining. An operation for the removal of a circular piece of bone from the skull.

Vaginitis. Inflammation of the vagina; it may be catarrhal, gonorrheal, ulcerative, or diphtheritic in character.

Vesicovaginal Fistula. An opening through the bladder and vagina.

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